DRAINAGE MANAGEMENT PLAN FOR THE GATEWAY CENTER

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APRIL, 1993

REVISED APRIL 27, 1999

PREPARED FOR:

SANDIA FOUNDATION

TWO WOODWARD CENTER

700 LOMAS BLVD. NE, SUITE 204

ALBUQUERQUE, NM 87102

40 YEARS

DRAINAGE MANAGEMENT PLAN
FOR THE
GATEWAY CENTER

APRIL 27, 1999

Prepared for:

SANDIA FOUNDATION
TWO WOODWARD CENTER
SUITE 204
700 LOMAS BOULEVARD NE
ALBUQUERQUE, NEW MEXICO 87102

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON NE
ALBUQUERQUE, NEW MEXICO 87109

I, Rick L. Beltramo, being a Registered Professional Engineer, registered in the State of New Mexico, hereby certify that this report was written by me or under my direct supervision, and that the information contained herein is true and accurate to the best of my knowledge and belief.

Rick L. Beltramo, P.E.
N.M.P.E. No. 10596

Date: 4/27/99

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Table of Contents

TABLE OF CONTENTS

TABLES

APPENDICES

EXHIBITS

I. PURPOSE

The purpose of this plan is to establish the management of storm water runoff from a 24.9± acre parcel of land. The parcel of land is being subdivided for site development by the owner, Sandia Foundation. The proposed development will be referred to as the "Gateway Center." This report presents the drainage management plan for development of the site.

This plan has been prepared in accordance with the prior reports approved by the City of Albuquerque, the pre-design meeting held with City Hydrology Division, and in accordance with the City of Albuquerque Development Process Manual (DPM), including the latest revisions dated July, 1997 (DPM update). Approval of this plan will allow rough grading to occur. Runoff calculations from individual developed sites will be necessary to control runoff amounts to those mandated by this plan.

II. PROJECT LOCATION AND DESCRIPTION

The project site is located at the northwest corner of the intersection of Interstate 25 (I-25) and Lomas Boulevard (see **Plan Sheet 1 of 2** for location map). The site is bounded by I-25 to the east, Lomas Boulevard to the south, Mountain Road to the north and Martineztown residential neighborhood to the west. The site generally slopes from east to west with 3:1 slopes adjacent to the interstate and Martineztown neighborhood. The north and south edges of the site slope steeply toward Mountain Road and Lomas Boulevard, respectively. Slopes vary greatly over the site ranging from near level to in excess of 1:1. In the central portion of the site is a large, relatively flat area that has been utilized in the past for gravel production. The west central portion of the site is traversed by a deep, bowled arroyo with its outlet at Maggie's Avenue (see **Plan Sheet 1**).

Soils on the site consist primarily of course to fine graded sands and gravel within the Bluepoint-Kokan Association (BKD). The SCS Soil Survey of Bernalillo County describes the Bluepoint-Kokan soils as soils which experience slow runoff and moderate or severe erosion. The

soil survey also identifies a portion of the site as Cut and Fill Land (CU), which is described as "sandy loam and very gravely sand." Both soil types are within hydrologic soils Group A.

III. HISTORIC (UNDEVELOPED) DRAINAGE

The project site is located within a larger watershed which has a history of flooding problems. However, recent storm drain improvements both upstream and downstream of the site have significantly reduced the magnitude of flooding in the watershed. With the completion of the I-25 northbound storm sewer diversion to Odelia Pond, the flooding hazard that currently exists at the Broadway Boulevard Pump Station, which is the terminus of the watershed in which the project site resides, has been partially relieved. Similarly, drainage improvements in Lomas Boulevard from Broadway to Eighth Street have relieved downstream flooding.

Interstate 25, which forms the easterly watershed boundary of the site precludes the majority of upstream offsite runoff from reaching the site. However, a small amount of offsite runoff does enter the site from the I-25 ROW near Lomas. Both Mountain Road and Lomas Boulevard have curb and gutter, which serve as watershed divides.

The site was subdivided into eleven existing condition basins (see **Plan Sheet 1 of 2**). Basins UD-1 and UD-2 drain directly to Mountain Road while Basin UD-7 drains directly to Lomas Boulevard. The remaining basins drain to the west to the Martineztown neighborhood. Runoff in Martineztown drains to Lomas Boulevard and Mountain Road, downstream of the project site. Hydrology calculation for the historic basins are shown on **Plan Sheet 1 of 2**. A summary of the 100-year historic peak discharge rates for each of these basins is shown in **Table 1**.

TABLE 1

HISTORIC 100-YEAR RUNOFF SUMMARY

BASIN	PEAK DISCHARGE (CFS)
To Lomas Boulevard	
UD-7	3.57
To Mountain Road	
UD-1	13.31
UD-2	2.47
Subtotal	15.78
To the Martineztown Neighborhood	
UD-3	2.81
UD-4	0.72
UD-5	18.39
UD-6	4.59
UD-8	3.67
UD-9	1.28
UD-10	0.34
UD-11	2.21
Subtotal	34.01
TOTAL	**53.36**

IV. DRAINAGE MANAGEMENT PLAN

A. General

Currently, the larger watershed in which the site resides is experiencing flooding problems. Unlike most development which increases runoff, this plan maintains the overall site runoff to historic levels. This plan includes grading and storm water runoff detention provisions that will reduce the aggregate runoff to Martineztown from the developed areas to 50% of the historic runoff. **Table 2** shows a comparison between the historical peak discharge and the developed peak discharge. (See summary of analysis

points following **Table 2**.) It is proposed that the street improvements will be allowed free discharge. However, even with some free discharge, the total runoff for this development will be approximately equal to historic runoff for the site (see Peak Discharge Summary, **Table 3**).

All of the proposed basins and the hydrologic analysis of the site and surrounding contributing areas for proposed conditions are shown on **Plan Sheet 2 of 2**.

B. Land Use

For each basin, the developed conditions 10-year and 100-year peak discharge rates were based on the following land treatment assumptions found in **Appendix 2**. These percentages were based upon typical development land treatment types. **Plan Sheet 2 of 2** shows the historic and developed 10-year and 100-year peak discharge rates for each proposed basin. Developed flow rates were based on the above land use percentages. Supporting hydrology calculations for the historic flow rates for the proposed basin configuration and maximum allowable peak discharge rates are shown in the **Appendix**. A significant reduction in the developed discharge rates occurs with the proposed detention scheme.

APP. 2

?

TABLE 2 QUESTIONS / ANSWERS

QUESTION	ANSWER
PROPOSED DEVELOPMENT BASINS MISSING FROM TABLE	A-1, A-2, B-1, B-3, D-1 ? — RUNOFF WILL DRAIN TO POND 3
	B-2 — RUNOFF WILL DRAIN TO UNDEVELOPED DETENTION #4A
	C-1 — RUNOFF WILL DRAIN TO POND #5
	C-3 ? STORM INLET ON WOODWARD PLACE, THEN TO LOMAS STORM DRAIN

TABLE 2

PROPOSED 100-YEAR RUNOFF SUMMARY

Existing Basin	Analysis Point	Historic Peak Discharge (cfs)	Post Development Basin	Post Development Q_{100}		* Maximum Allowable Developed Peak Discharge (cfs)	Flowrate Reduction (cfs)
UD-1	AP#1 & AP#2	13.31	A-3 A-5 A-4	0.46 0.98 3.77 Σ = 5.21	<	6.66	8.10
UD-2	AP#3	2.47	D-2 D-3	0.35 0.21	<	1.24	1.91
UD-3	AP#4	2.81	D-4 E-1 E-2	0.56 0.24 1.45 0.34	>	1.41	0.78
UD-4	AP#5	0.72	G-1	Σ=2.03 REV.(D-4) 1.27 0.75	>	0.36	0.00
UD-5	AP#6	18.39	F-1	3.07	<	9.20	15.32
UD-6	AP#7, AP#8, & AP#9	4.59	F-2 F-3 H-1	1.07 0.25 2.66	>	2.30	0.61
UD-7	AP#14	3.57 357	C-2 I-2	Σ=3.98 0.69 1.11 Σ=1.80	≈=	1.79	1.77
UD-8	AP#11	3.67	I-3	2.14	>	1.84	2.08
UD-9	AP#10	1.28	H-2	0.47	<	0.64	0.81
UD-10	AP#12	0.34	I-4	0.56	>	0.17	0.20
UD-11	AP#13	2.21	I-1	** 0		1.11	2.21
	TOTALS	51.15 53.36		**20.57**	<	**25.61**	

**** Maximum Allowable Developed Peak Discharge = (0.5) (Historic Peak Discharge)***
***** Post-Development Q is discharging into a proposed storm drain.***

SUMMARY OF ANALYSIS POINTS

➢ **AP#1 & AP#2**

Existing Basin UD-1 discharges to AP#1 and AP#2 with a total historic peak discharge of 13.31 cfs directly into Mountain Road. The developed peak discharge to AP#1 is 1.44 cfs (from Basins A-3 and A-5), and 3.77 cfs to AP#2 (from Basin A-4). This post-development Q will be released via sheet flow, directly into Mountain Road, resulting in a reduction of 8.10 cfs from the pre-developed conditions

➢ **AP#3**

Existing Basin UD-2 discharges 2.47 cfs onto Mountain Road at AP#3. The post-development Basins D-2 and D-3 discharge 0.35 cfs and 0.21 cfs at AP#3. This results in a reduction of 1.91 cfs being discharged directly onto Mountain Road.

➢ **AP#4**

Existing Basin UD-3 has a historic peak discharge of 2.81 cfs. This runoff is sheet flowing onto the lots adjacent to the site and to the east and south of High Street. The post-development basins, D-4, E-1 and E-2 will release a total of 2.03 cfs onto the same area. Basin D-4 is discharging 0.24 cfs (an increase of 0.02 cfs over the existing conditions) onto the lots east of High Street in the same drainage pattern as the existing conditions. Basin E-2 is discharging 0.34 cfs (the same as existing) onto the lot south of High Street, also with the same drainage pattern as existing conditions. Basin E-1 has a total developed peak discharge of 1.45 cfs. This runoff will be directed, via a swale, to run along the property line in a westerly direction in order to discharge directly into High Street rather than sheet flowing through the adjacent lots as it does under existing conditions.

➢ **AP#5**

Existing Basin UD-4 releases a total historic peak discharge of 0.72 cfs at Analysis Point #5. The post-development basin, G-1, will discharge an increase of 0.03 cfs at this point for a total of 0.75 cfs and remains mostly in the pre-developed condition with no change to the drainage patterns.

➢ **AP#6**

Existing Basin UD-5 directs 18.39 cfs, via a swale toward the property to the south of Maggie's Avenue. Basin F-1 discharges 3.07 cfs, greatly reducing the historic runoff. The basin will be graded to direct the majority of the runoff directly toward Maggies Avenue rather than through the adjacent lots.

➢ **AP#7, AP#8 & AP#9**

Existing drainage Basin UD-6 discharges 4.59 cfs towards Analysis Points 7, 8 and 9, sheet flowing onto the lots adjacent to the site boundary line. Post-development Basins F-2, F-3 and H-1 release 1.07 cfs, 0.25 cfs and 2.66 cfs respectively, for a total runoff of 3.98 cfs (a reduction of 0.61 cfs from existing conditions). Basin F-2 will direct its 1.07 cfs at AP#7 toward an existing offsite swale which bypasses the adjacent homes. Basin F-3 will sheet flow onto the adjacent lots in the same manner as the existing drainage pattern, but with a total runoff of only 0.25 cfs. Basin H-1 will be graded to direct its discharge of 2.66 cfs toward Marble Avenue rather than sheet flowing through the lots as in the existing drainage patterns.

➢ **AP#10**

Existing Basin UD-9 discharges 1.28 cfs toward AP#10. The post-development Basin H-2 will discharge 0.47 cfs toward the same point, which is a reduction of 0.81 cfs. The drainage patterns remain the same since most of the basin remains in its natural state.

➢ **AP#11**

Existing Basin UD-8 discharges 3.67 cfs toward AP#11 at the easterly end of Page Avenue. Basin I-3 reduces the existing Q to 1.59 cfs and will be graded to direct the flow toward Page Avenue and away from the adjacent lot and home.

➢ **AP#12**

Existing Basin UD-10 has a total runoff of 0.34 cfs. Basin I-5 will reduce the runoff to AP#12 to 0.14 cfs thus reducing the amount of runoff sheet flowing onto the adjacent lot by 0.20 cfs.

➢ **AP#13**

Existing Basin UD-11 discharges 2.21 cfs toward the east end of Slate Avenue. Basin I-1 generates 3.65 cfs of post-development runoff at AP#13. This discharge will be picked up by a proposed 12" storm drain connecting to the existing system in Lomas Boulevard, thus reducing the overland runoff to 0 cfs.

➢ **AP#14**

Existing Basin UD-7 drains toward AP#14, discharging a total of 3.57 cfs. The offsite post-development Basins C-2 and I-2 will discharge 0.69 cfs and 1.11 cfs, respectively, toward AP#14 for a total reduction in runoff of 1.77 cfs.

The runoff from post-development Basins A-1, A-2, B-1 and D-1 will enter a proposed underground storm drainage system which ultimately discharges into an existing system in Mountain Road. Basin B-2, B-3, C-1, C-3, C-4, C-5 and I-1 are also draining into proposed storm drainage pipes which will transport the runoff into the existing drainage system in Lomas Boulevard. See Table 2 for the maximum allowable developed peak discharge from these basins.

page 5 = 51.15 cfs

TABLE 3

PEAK DISCHARGE SUMMARY

- Total Historic Peak Discharge: 53.4 cfs
- Total Developed Peak Discharge to Residential Area (see Tab;e 2): 20.57 cfs
- Total Allowable Discharge from Ponds and Street:

  53.40 cfs - Historic Peak Discharge
  - 20.57 cfs - Developed Peak Discharge to Residential
  32.83 cfs - Allowable Remaining

- Discharge to Mountain Road
  - Pond 3:

    Basin "A-1": Q_{100}(Hist) = 4.42 cfs Q_{100}(Dev) = 10.05 cfs
    Basin "A-2": Q_{100}(Hist) = 0.41 cfs Q_{100}(Dev) = 0.41 cfs
    Basin "D-1": Q_{100}(Hist) = 3.56 cfs Q_{100}(Dev) = 7.99 cfs
    8.39 cfs 18.45 cfs

    * Max. Release from Pond 3: Actual Release = 2.48 cfs
    8.39/2 = 4.20 cfs
  - Underground Detention #4:

    Basin "B-1": Q_{100}(Hist) = 9.11 cfs Q_{100}(Dev) = 20.49 cfs
    Basin "B-3": Q_{100}(Hist) = 0.27 cfs Q_{100}(Dev) = 0.28 cfs
    9.38 cfs 20.77 cfs

    * Max. Release from Underground Actual Release = 3.42 cfs
    Det #4: 9.38/2 = 4.69 cfs
  - Basin "A-3": Q_{100}(Dev) = 0.45 cfs
  - Basin "A-4": Q_{100}(Dev) = 3.74 cfs
  - Basin "A-5": Q_{100}(Dev) = 0.99 cfs
  - Basin "D-2": Q_{100}(Dev) = 0.35 cfs
  - Basin "D-3": Q_{100}(Dev) = 0.22 cfs

  Sub-Total (To Mountain Road) 11.65 cfs

- Discharge to Lomas Boulevard
  - Pond 2:

    Basin "C-5": Q_{100}(Hist) = 8.36 cfs Q_{100}(Dev) = 13.87 cfs

    * Max. Release from Pond 2: Actual Release = 1.45 cfs
    8.36/2 = 4.18 cfs
  - Underground Detention #4A:

    Basin "B-2": Q_{100}(Hist) = 4.18 cfs Q_{100}(Dev) = 9.37 cfs

    * Max. Release from Underground Actual Release = 1.45 cfs
    Det #4A: 4.18/2 = 2.09 cfs
  - Pond 5:

    Basin "C-1": Q_{100}(Hist) = 3.51 cfs Q_{100}(Dev) = 7.49 cfs

    * Max. Release from Pond 5: Actual Release = 1.19 cfs
    3.51/2 = 1.76 cfs
  - Basin "C-2": Q_{100}(Dev) = 0.69 cfs
  - Basin "C-3": Q_{100}(Dev) = 3.12 cfs
  - Basin "C-4": Q_{100}(Dev) = 3.94 cfs
  - Basin "I-2": Q_{100}(Dev) = 1.11 cfs
  - Basin "I-1": Q_{100}(Dev) = 3.60 cfs

  Sub-Total (To Lomas Boulevard) 16.55 cfs

TOTAL **28.20 cfs**

BASIN D4 → 5.75

5.90

12.46 cfs

28.20 < 32.83

C. Grading/Drainage Plan

Under existing conditions, the proposed drainage basins to the east of proposed Woodward Place primarily drain directly to either Lomas Boulevard or Mountain Road. Under the proposed plan, the historic flow destinations for these basin will be honored. The proposed street will also drain to these locations as well as a portion of the site west of the proposed street (Basins C-5, D-1, D-2, D-3, I-1 and I-2). The grading plan will drain basins B-2, C-1, C-2, C-3, C-4, C-5, I-1 and I-2 to Lomas Boulevard, while basins A-1, A-2, A-3, A-4, A-5, D-1, D-2 and D-3 will drain to Mountain Road. Table 1 provides a summary of the 100-year historic peak discharge rates to both Lomas Boulevard and Mountain Road.

D. Runoff to Lomas Boulevard and Mountain Road

Based on the restriction of limiting the developed site (non-street) flow rates to 50% of historic levels, detention ponds have been provided to achieve discharge reductions for each graded site draining to Lomas Boulevard or Mountain Road. The pond volumes provided for each basin are shown in Table 4. Runoff will be discharged from these ponds directly into the existing storm drainage systems in Lomas Boulevard and Mountain Road. A proposed storm drain system will be designed to collect the proposed controlled discharge from the ponds, as well as runoff from portions of proposed Woodward Place. Storm drains will then convey the flow from the proposed inlets to existing storm drains in Lomas Boulevard and Mountain Road.

Also as a part of this plan, the north leg of the High Street/Lomas Boulevard intersection will be reconstructed to provide an 8" water block on High Street to prevent runoff on Lomas Boulevard from entering High Street.

Not shown on Grading Drainage Plan & Street

TABLE 4

POND VOLUMES SUMMARY

POND	VOLUME (AC. FT.)	PEAK RELEASE (CFS)
2	0.500	1.45
3	0.971	5.90
4	0.759	3.42
4A	0.367	1.45
5	0.366	1.19

V. EROSION CONTROL PLAN

The contractor shall ensure that no soil erodes from the site into public right-of-way or adjacent property. Plan Sheet 2 of 2 provides a temporary erosion control detail for erosion control purposes. The western slopes of this site shall be seeded to control cutting of the swales.

VI. CONCLUSION

This plan presents a grading/drainage plan for the "Gateway Center." For each developed site, excluding the street, the flow rate will be reduced to 50% of the historic site runoff and the proposed street will be allowed free discharge. Overall runoff from the site will be the same as historic as a result of on-site detention storage provided.

The developed sites draining toward the neighboring residential area, west of the site will have a total discharge of less than 50% of the 100-year storm historic runoff and the proposed street will have free discharge. By controlling the discharge from the developed sites, the overall runoff will be slightly less than historic.

Appendix

APPENDIX A

PRE-DESIGN CONFERENCE NOTES

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
UTILITY DEVELOPMENT DIVISION/HYDROLOGY SECTION

PRE-DESIGN CONFERENCE

DRAINAGE FILE/ZONE ATLAS PAGE NO.: J15-D35 DATE: 3/11/93

EPC NO.: _____ DRB NO.: _____ ZONE: _____

SUBJECT: SADIA FOUNDATION / FEDERAL COURTHOUSE SITE

STREET ADDRESS: INTERSECTION OF LOMAS AND I-25 (N.W. CORNER)

LEGAL DESCRIPTION: UNPLATTED

APPROVAL REQUESTED:

X	PRELIMINARY PLAT	X	FINAL PLAT (4 LOT SUBDIVISION)
____	SITE DEVELOPMENT PLAN	____	BUILDING PERMIT
____	GRADING/PAVING PERMIT	X	OTHER

SITE PLAN FOR SUBDIVISION

ATTENDANCE:	WHO	REPRESENTING
	MIKE EMERY	BOHANNAN
	JAMES TOPMILLER	BOHANNAN
	DAN HOGAN	CITY
	FRED J. AGUIRRE	CITY

FINDINGS:

PHASE 1 DEVELOPMENT: AN APPROVED CONCEPTUAL GRADING & DRAINAGE PLAN IS REQUIRED FOR SITE PLAN FOR SUBDIVISION APPROVAL.

THE TARGET DISCHARGE FOR PHASE 1 IS 50% OF THE HISTORIC FLOW RATE BUT IN NO CASE ~~BE~~ WILL THE FLOW BE GREATER THAN HISTORIC FLOW RATE. THE GOAL OF THIS PLAN ~~IS~~ AND FUTURE PHASES IS TO DIVERT THE MAXIMUM FLOWS AWAY FROM MARTINEZ TOWN AND INTO LOMAS.

THIS PLAN WILL NEED TO ADDRESS ~~THE~~ AND RESOLVE THE POTENTIAL FOR STORM DRAIN FLOWS ENTERING MARTINEZ TOWN THRU HIGH ST FROM LOMAS. THIS IS WARRENTED AS A RESULT OF THE INCREASED IMPERVIOUS FLOWS TO LOMAS.

NOTE: PHASE 1 DEVELOPMENT IS ABOUT WOODWARD PL.

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

SIGNED:	[signature]	SIGNED:	[signature]
TITLE:		TITLE:	SADIA FOUNDATION REP
DATE:		DATE:	3/11/93

NOTE PLEASE PROVIDE A COPY OF THIS PRE-DESIGN FORM WITH THE DRAINAGE SUBMITTAL. A 1/

APPENDIX B

AHYMO INPUT & OUTPUT FILES FOR EXISTING AND PROPOSED CONDITIONS

```
*
*S Developed Gateway
START                RAINFALL BEGINS AT 0.00 HOURS
*                      100 YEAR RETURN PERIOD
**********************************************************************
*
*       ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
*       ::                          MISC. DATA                        ::
*       ::         RAINFALL RETURN PERIOD_____________  100-YEAR      ::
*       ::         RAINFALL DURATION__________________  6-HOUR        ::
*       ::         ZONE 2                                             ::
*       ::         RAINFALL DEPTHS: 1 HOUR (P60)___  2.01 INCHES      ::
*       ::         (UNADJUSTED)     6 HOUR (P360)__  2.35 INCHES      ::
*       ::                         24 HOUR (P1440)_  2.75 INCHES      ::
*       ::                                                            ::
*       ::         RAINFALL DATA TAKEN FROM NOAA.                     ::
*       ::                                                            ::
*       ::                 HYDROGRAPH METHODOLOGY                     ::
*       ::                                                            ::
*       ::         CITY OF ALBQ. DPM VOL. 2, SECTION 22.2 July, 1997  ::
*       ::         INITIAL ABSTRACTION - INFILTRATION METHOD           ::
*       ::         Tc CALCULATIONS PER C.O.A. DPM 22.2-B.4             ::
*       ::         AMAFCA AHYMO VERSION MARCH 20,1992                  ::
*       ::                                                            ::
*       ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
*                              BEGIN  ANALYSIS
**********************************************************************
*
RAINFALL              TYPE=1 RAIN QUARTER=0.0 RAIN ONE=2.01
                      RAIN SIX=2.35 RAIN DAY=2.75 DT=0.05
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B2 *********
COMPUTE NM HYD        ID=1 HYD=B2  AREA=0.00358 PER A=0.0 PER B=10.0
                      PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=1   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C3 *********
COMPUTE NM HYD        ID=2 HYD=C3  AREA=0.00112 PER A=0.0 PER B=0.0
                      PER C=20.0 PER D=80.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=2   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C5 *********
COMPUTE NM HYD        ID=3 HYD=C5  AREA=0.00530 PER A=0.0 PER B=10.0
                      PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=3   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C4 *********
COMPUTE NM HYD        ID=4 HYD=C4  AREA=0.00137 PER A=0.0 PER B=0.0
                      PER C=10.0 PER D=90.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=4   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C1 *********
COMPUTE NM HYD        ID=5 HYD=C1  AREA=0.00286 PER A=0.0 PER B=10.0
                      PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=5   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN I1 *********
COMPUTE NM HYD        ID=6 HYD=I1  AREA=0.00137 PER A=0.0 PER B=10.0
                      PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=6   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B1 *********
COMPUTE NM HYD        ID=7 HYD=B1  AREA=0.00783 PER A=0.0 PER B=10.0
                      PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=7   CODE=1
      **** COMPUTE AND PRINT NM HYD DATA FOR BASIN A4 *********
COMPUTE NM HYD        ID=8 HYD=A4  AREA=0.00130 PER A=0.0 PER B=0.0
                      PER C=10.0 PER D=90.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=8   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A1 *********
COMPUTE NM HYD        ID=9 HYD=A1  AREA=0.00384 PER A=0.0 PER B=10.0
                      PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=9   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D1 *********
COMPUTE NM HYD        ID=10 HYD=D1  AREA=0.00305 PER A=0.0 PER B=10.0
                      PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1
PRINT HYD                ID=10   CODE=1
```

```
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B3 *********
COMPUTE NM HYD       ID=11 HYD=B3  AREA=0.00016 PER A=0.0 PER B=50.0
                     PER C=50.0 PER D=0.0  TP=.133  RAINFALL=-1
PRINT HYD               ID=11   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A2 *********
COMPUTE NM HYD       ID=12 HYD=A2  AREA=0.00020 PER A=0.0 PER B=0.0
                     PER C=100.0 PER D=0.0  TP=.133  RAINFALL=-1
PRINT HYD               ID=12   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A3 *********
COMPUTE NM HYD       ID=13 HYD=A3  AREA=0.00042 PER A=90.0 PER B=0.0
                     PER C=10.0 PER D=0.0  TP=.133  RAINFALL=-1
PRINT HYD               ID=13   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A5 *********
COMPUTE NM HYD       ID=14 HYD=A5  AREA=0.00044 PER A=0.0 PER B=50.0
                     PER C=0.0 PER D=50.0  TP=.133  RAINFALL=-1
PRINT HYD               ID=14   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D3 *********
COMPUTE NM HYD       ID=15 HYD=D3  AREA=0.00009 PER A=0.0 PER B=50.0
                     PER C=0.0 PER D=50.0  TP=.133  RAINFALL=-1
PRINT HYD               ID=15   CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D2 *********
COMPUTE NM HYD       ID=16 HYD=D2  AREA=0.00017 PER A=0.0 PER B=0.0
                     PER C=100.0 PER D=0.0  TP=.133  RAINFALL=-1
PRINT HYD               ID=16   CODE=1
*
**********************************************************************
*DETERMINATION OF POND:
*******ROUTE BASIN C-5 THROUGH DETENTION POND
ROUTE RESERVOIR      ID=20 HYD=POND2 INFLOW ID=3  CODE=10
                     OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                         0              0            5020
                         1.34           0.308286     5022
                         1.64           0.499562     5023
*
PRINT HYD            ID=20      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS C5 AND C4**********
*S COMBINE HYDROGRAPHS FOR BASINS C5 AND C4
ADD HYD                 ID=21 HYD=21 ID I=20 ID II=4
*
PRINT HYD               ID=21   CODE=1
*
**********************************************************************
*DETERMINATION OF POND:
*******ROUTE BASIN B-2 THROUGH UNDERGROUND DETENTION POND
ROUTE RESERVOIR      ID=22 HYD=POND4A INFLOW ID=1  CODE=10
                     OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                         0              0            5028
                         1.82           0.293846     5030
                         2.03           0.367308     5030.5
*
PRINT HYD            ID=22      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS B2 AND C3**********
*S COMBINE HYDROGRAPHS FOR BASINS B2 AND C3
ADD HYD                 ID=23 HYD=23 ID I=22 ID II=2
*
PRINT HYD               ID=23   CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS B2+C3 AND C5+C4 **********
*S COMBINE HYDROGRAPHS FOR BASINS B2+C3 AND C5+C4
ADD HYD                 ID=24 HYD=24 ID I=23 ID II=21
*
PRINT HYD               ID=24   CODE=1
*
**********************************************************************
*DETERMINATION OF POND:
*******ROUTE BASIN C-1 THROUGH DETENTION POND
ROUTE RESERVOIR      ID=25 HYD=POND5 INFLOW ID=5  CODE=10
                     OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
```

```
                    0               0           5020
                    1.12            0.150931    5022
                    1.59            0.36632     5024
*
PRINT HYD           ID=25      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1**********
*S COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1
ADD HYD             ID=26 HYD=26 ID I=24 ID II=25
*
PRINT HYD           ID=26   CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS B3 AND B1**********
*S COMBINE HYDROGRAPHS FOR BASINS B3 AND B1
ADD HYD             ID=28 HYD=28 ID I=11 ID II=7
*
PRINT HYD           ID=28   CODE=1
*
**********************************************************************
*DETERMINATION OF POND:
*******ROUTE BASIN B1+B3 THROUGH DETENTION POND
ROUTE RESERVOIR     ID=29 HYD=POND4 INFLOW ID=28  CODE=10
                    OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                        0               0           5022
                        4.09            0.607206    5024
                        4.58            0.759008    5024.5
*
PRINT HYD           ID=29      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS A2 AND A1**********
*S COMBINE HYDROGRAPHS FOR BASINS A2 AND A1
ADD HYD             ID=30 HYD=30 ID I=12 ID II=9
*
PRINT HYD           ID=30   CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS B1+B3 AND A1+A2 **********
*S COMBINE HYDROGRAPHS FOR BASINS B1+B3 AND A1+A2+D1
ADD HYD             ID=31 HYD=31 ID I=30 ID II=29
ADD HYD             ID=32 HYD=32 ID I=31 ID II=10
*
PRINT HYD           ID=32   CODE=1
*
**********************************************************************
*DETERMINATION OF POND:
*******ROUTE-NORTH BASINS THROUGH DETENTION POND
ROUTE RESERVOIR     ID=33 HYD=POND3 INFLOW ID=32  CODE=10
                    OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                        0               0           5008
                        4.53            0.214141    5010
                        6.40            0.531449    5012
                        7.84            0.964482    5014
*
PRINT HYD           ID=33      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 **********
*S COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2
ADD HYD             ID=34 HYD=34 ID I=13 ID II=14
ADD HYD             ID=35 HYD=35 ID I=15 ID II=16
ADD HYD             ID=36 HYD=36 ID I=34 ID II=35
*
PRINT HYD           ID=36   CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 AND NORTH BASINS**********
*S COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 AND NORTH BASINS
ADD HYD             ID=37 HYD=37 ID I=33 ID II=36
*
PRINT HYD           ID=37   CODE=1
FINISH
```

Out

```
 AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
      RUN DATE (MON/DAY/YR) = 08/12/1998
      START TIME (HR:MIN:SEC) = 13:19:47     USER NO.= BOHN_HNM.STE
      INPUT FILE = PONDIN.TXT

*
*S Developed Gateway
START                 RAINFALL BEGINS AT 0.00 HOURS
*                       100 YEAR RETURN PERIOD
*****************************************************************************
*
*       ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
*       ::                          MISC. DATA                              ::
*       ::        RAINFALL RETURN PERIOD_____________  100-YEAR             ::
*       ::        RAINFALL DURATION__________________  6-HOUR                   ::
*       ::            ZONE 2                                                        ::

*       ::        RAINFALL DEPTHS: 1 HOUR (P60)___  2.01 INCHES             ::
*       ::        (UNADJUSTED)      6 HOUR (P360)__  2.35 INCHES            ::
*       ::                         24 HOUR (P1440)_  2.75 INCHES            ::
*       ::                                                                  ::
*       ::        RAINFALL DATA TAKEN FROM NOAA.                            ::
*       ::                                                                  ::
*       ::              HYDROGRAPH METHODOLOGY                              ::
*       ::                                                                  ::
*       ::        CITY OF ALBQ. DPM VOL. 2, SECTION 22.2 July, 1997         ::
*       ::        INITIAL ABSTRACTION - INFILTRATION METHOD                 ::
*       ::        Tc CALCULATIONS PER C.O.A. DPM 22.2-B.4                   ::
*       ::        AMAFCA AHYMO VERSION MARCH 20,1992                        ::
*       ::                                                                  ::
*       ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
*                             BEGIN  ANALYSIS
*****************************************************************************
*
RAINFALL              TYPE=1 RAIN QUARTER=0.0 RAIN ONE=2.01
                      RAIN SIX=2.35 RAIN DAY=2.75 DT=0.05

                 COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                 DT =     .050000 HOURS        END TIME =     6.000000 HOURS
                    .0000   .0024   .0049   .0075   .0102   .0130   .0158
                    .0188   .0219   .0252   .0286   .0321   .0358   .0397
                    .0439   .0482   .0529   .0578   .0631   .0689   .0751
                    .0836   .0930   .1201   .1842   .2944   .4649   .7103
                   1.0460  1.3107  1.4303  1.5302  1.6176  1.6959  1.7667
                   1.8313  1.8906  1.9452  1.9955  2.0421  2.0851  2.0946
                   2.1034  2.1115  2.1191  2.1262  2.1330  2.1394  2.1455
                   2.1513  2.1569  2.1622  2.1673  2.1723  2.1771  2.1817
                   2.1862  2.1905  2.1948  2.1989  2.2028  2.2067  2.2105
                   2.2142  2.2178  2.2213  2.2248  2.2282  2.2315  2.2347
                   2.2379  2.2410  2.2440  2.2470  2.2500  2.2529  2.2557
                   2.2585  2.2613  2.2640  2.2666  2.2693  2.2719  2.2744
                   2.2769  2.2794  2.2818  2.2842  2.2866  2.2889  2.2913
                   2.2935  2.2958  2.2980  2.3002  2.3024  2.3046  2.3067
                   2.3088  2.3109  2.3129  2.3150  2.3170  2.3190  2.3209
                   2.3229  2.3248  2.3267  2.3286  2.3305  2.3323  2.3342
                   2.3360  2.3378  2.3396  2.3414  2.3431  2.3449  2.3466
                   2.3483  2.3500

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B2 *********
COMPUTE NM HYD        ID=1 HYD=B2  AREA=0.00358 PER A=0.0 PER B=10.0
                                   PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1

    K =    .072485HR    TP =    .133000HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   9.9161    CFS   UNIT VOLUME =     .9981       B =   526.28      P60 = 2.0100
    AREA =       .002506 SQ MI    IA =     .10000 INCHES    INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000


    K =    .115400HR    TP =    .133000HR    K/TP RATIO =    .867666     SHAPE CONSTANT, N =  4.095337
    UNIT PEAK =   2.9190    CFS   UNIT VOLUME =     .9972       B =   361.48      P60 = 2.0100
    AREA =       .001074 SQ MI    IA =     .40000 INCHES    INF =     .97000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000

PRINT HYD                     ID=1   CODE=1

                                   HYDROGRAPH FROM AREA B2
```

RUNOFF VOLUME = 1.78077 INCHES = .3400 ACRE-FEET
PEAK DISCHARGE RATE = 9.37 CFS AT 1.500 HOURS BASIN AREA = .0036 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C3 *********
COMPUTE NM HYD ID=2 HYD=C3 AREA=0.00112 PER A=0.0 PER B=0.0
PER C=20.0 PER D=80.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.5454 CFS UNIT VOLUME = .9960 B = 526.28 P60 = 2.0100
AREA = .000896 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .107204HR TP = .133000HR K/TP RATIO = .806046 SHAPE CONSTANT, N = 4.440701
UNIT PEAK = .64597 CFS UNIT VOLUME = .9814 B = 383.55 P60 = 2.0100
AREA = .000224 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA C3

RUNOFF VOLUME = 1.91924 INCHES = .1146 ACRE-FEET
PEAK DISCHARGE RATE = 3.12 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C5 *********
COMPUTE NM HYD ID=3 HYD=C5 AREA=0.00530 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 14.680 CFS UNIT VOLUME = .9983 B = 526.28 P60 = 2.0100
AREA = .003710 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 4.3214 CFS UNIT VOLUME = .9987 B = 361.48 P60 = 2.0100
AREA = .001590 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=3 CODE=1

HYDROGRAPH FROM AREA C5

RUNOFF VOLUME = 1.78077 INCHES = .5034 ACRE-FEET
PEAK DISCHARGE RATE = 13.87 CFS AT 1.500 HOURS BASIN AREA = .0053 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C4 *********
COMPUTE NM HYD ID=4 HYD=C4 AREA=0.00137 PER A=0.0 PER B=0.0
PER C=10.0 PER D=90.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 4.8789 CFS UNIT VOLUME = .9971 B = 526.28 P60 = 2.0100
AREA = .001233 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .107204HR TP = .133000HR K/TP RATIO = .806046 SHAPE CONSTANT, N = 4.440701
UNIT PEAK = .39508 CFS UNIT VOLUME = .9693 B = 383.55 P60 = 2.0100
AREA = .000137 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=4 CODE=1

HYDROGRAPH FROM AREA C4

RUNOFF VOLUME = 2.01838 INCHES = .1475 ACRE-FEET

Out
PEAK DISCHARGE RATE = 3.94 CFS AT 1.500 HOURS BASIN AREA = .0014 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C1 *********
COMPUTE NM HYD ID=5 HYD=C1 AREA=0.00286 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 7.9218 CFS UNIT VOLUME = .9979 B = 526.28 P60 = 2.0100
AREA = .002002 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 2.3319 CFS UNIT VOLUME = .9965 B = 361.48 P60 = 2.0100
AREA = .000858 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=5 CODE=1

HYDROGRAPH FROM AREA C1

RUNOFF VOLUME = 1.78077 INCHES = .2716 ACRE-FEET
PEAK DISCHARGE RATE = 7.49 CFS AT 1.500 HOURS BASIN AREA = .0029 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN I1 *********
COMPUTE NM HYD ID=6 HYD=I1 AREA=0.00137 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.7947 CFS UNIT VOLUME = .9966 B = 526.28 P60 = 2.0100
AREA = .000959 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 1.1170 CFS UNIT VOLUME = .9910 B = 361.48 P60 = 2.0100
AREA = .000411 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=6 CODE=1

HYDROGRAPH FROM AREA I1

RUNOFF VOLUME = 1.78077 INCHES = .1301 ACRE-FEET
PEAK DISCHARGE RATE = 3.60 CFS AT 1.500 HOURS BASIN AREA = .0014 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B1 *********
COMPUTE NM HYD ID=7 HYD=B1 AREA=0.00783 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 21.688 CFS UNIT VOLUME = .9986 B = 526.28 P60 = 2.0100
AREA = .005481 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 6.3843 CFS UNIT VOLUME = .9998 B = 361.48 P60 = 2.0100
AREA = .002349 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=7 CODE=1

HYDROGRAPH FROM AREA B1

RUNOFF VOLUME = 1.78077 INCHES = .7436 ACRE-FEET
PEAK DISCHARGE RATE = 20.49 CFS AT 1.500 HOURS BASIN AREA = .0078 SQ. MI.

```
      **** COMPUTE AND PRINT NM HYD DATA FOR BASIN A4 *********
COMPUTE NM HYD       ID=8 HYD=A4  AREA=0.00130 PER A=0.0 PER B=0.0
                               PER C=10.0 PER D=90.0  TP=.133  RAINFALL=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   4.6296    CFS  UNIT VOLUME =    .9966       B =   526.28      P60 = 2.0100
    AREA =      .001170 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .107204HR    TP =   .133000HR    K/TP RATIO =   .806046     SHAPE CONSTANT, N =  4.440701
    UNIT PEAK =   .37490    CFS   UNIT VOLUME =    .9693       B =   383.55      P60 = 2.0100
    AREA =      .000130 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD                  ID=8   CODE=1

                                   HYDROGRAPH FROM AREA A4


    RUNOFF VOLUME =     2.01838 INCHES     =        .1399 ACRE-FEET
    PEAK DISCHARGE RATE =       3.74 CFS  AT   1.500 HOURS   BASIN AREA =   .0013 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A1 *********
COMPUTE NM HYD       ID=9 HYD=A1  AREA=0.00384 PER A=0.0 PER B=10.0
                               PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   10.636    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 2.0100
    AREA =      .002688 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .115400HR    TP =   .133000HR    K/TP RATIO =   .867666     SHAPE CONSTANT, N =  4.095337
    UNIT PEAK =   3.1310    CFS   UNIT VOLUME =    .9978       B =   361.48      P60 = 2.0100
    AREA =      .001152 SQ MI    IA =    .40000 INCHES    INF =    .97000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD                  ID=9   CODE=1

                                   HYDROGRAPH FROM AREA A1


    RUNOFF VOLUME =     1.78077 INCHES     =        .3647 ACRE-FEET
    PEAK DISCHARGE RATE =      10.05 CFS  AT   1.500 HOURS   BASIN AREA =   .0038 SQ. MI.


**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D1 *********
COMPUTE NM HYD       ID=10 HYD=D1  AREA=0.00305 PER A=0.0 PER B=10.0
                               PER C=20.0 PER D=70.0  TP=.133  RAINFALL=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.4481    CFS   UNIT VOLUME =    .9979       B =   526.28      P60 = 2.0100
    AREA =      .002135 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .115400HR    TP =   .133000HR    K/TP RATIO =   .867666     SHAPE CONSTANT, N =  4.095337
    UNIT PEAK =   2.4868    CFS   UNIT VOLUME =    .9965       B =   361.48      P60 = 2.0100
    AREA =      .000915 SQ MI    IA =    .40000 INCHES    INF =    .97000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD                  ID=10   CODE=1

                                   HYDROGRAPH FROM AREA D1


    RUNOFF VOLUME =     1.78077 INCHES     =        .2897 ACRE-FEET
    PEAK DISCHARGE RATE =       7.99 CFS  AT   1.500 HOURS   BASIN AREA =   .0031 SQ. MI.


**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B3 *********
COMPUTE NM HYD       ID=11 HYD=B3  AREA=0.00016 PER A=0.0 PER B=50.0
```

Out
PER C=50.0 PER D=0.0 TP=.133 RAINFALL=-1

K = .119497HR TP = .133000HR K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947
UNIT PEAK = .42284 CFS UNIT VOLUME = .9692 B = 351.48 P60 = 2.0100
AREA = .000160 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=11 CODE=1

HYDROGRAPH FROM AREA B3

RUNOFF VOLUME = .93603 INCHES = .0080 ACRE-FEET
PEAK DISCHARGE RATE = .28 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A2 *********
COMPUTE NM HYD ID=12 HYD=A2 AREA=0.00020 PER A=0.0 PER B=0.0
PER C=100.0 PER D=0.0 TP=.133 RAINFALL=-1

K = .107204HR TP = .133000HR K/TP RATIO = .806046 SHAPE CONSTANT, N = 4.440701
UNIT PEAK = .57676 CFS UNIT VOLUME = .9814 B = 383.55 P60 = 2.0100
AREA = .000200 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=12 CODE=1

HYDROGRAPH FROM AREA A2

RUNOFF VOLUME = 1.12613 INCHES = .0120 ACRE-FEET
PEAK DISCHARGE RATE = .41 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A3 *********
COMPUTE NM HYD ID=13 HYD=A3 AREA=0.00042 PER A=90.0 PER B=0.0
PER C=10.0 PER D=0.0 TP=.133 RAINFALL=-1

K = .154535HR TP = .133000HR K/TP RATIO = 1.161917 SHAPE CONSTANT, N = 3.050921
UNIT PEAK = .90299 CFS UNIT VOLUME = .9836 B = 285.95 P60 = 2.0100
AREA = .000420 SQ MI IA = .62000 INCHES INF = 1.58600 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=13 CODE=1

HYDROGRAPH FROM AREA A3

RUNOFF VOLUME = .57192 INCHES = .0128 ACRE-FEET
PEAK DISCHARGE RATE = .45 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A5 *********
COMPUTE NM HYD ID=14 HYD=A5 AREA=0.00044 PER A=0.0 PER B=50.0
PER C=0.0 PER D=50.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .87053 CFS UNIT VOLUME = .9866 B = 526.28 P60 = 2.0100
AREA = .000220 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .131790HR TP = .133000HR K/TP RATIO = .990905 SHAPE CONSTANT, N = 3.563124
UNIT PEAK = .53744 CFS UNIT VOLUME = .9767 B = 324.91 P60 = 2.0100
AREA = .000220 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=14 CODE=1

HYDROGRAPH FROM AREA A5

RUNOFF VOLUME = 1.44763 INCHES = .0340 ACRE-FEET
PEAK DISCHARGE RATE = .99 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

```
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D3 *********
COMPUTE NM HYD       ID=15 HYD=D3  AREA=0.00009 PER A=0.0 PER B=50.0
                                   PER C=0.0 PER D=50.0  TP=.133  RAINFALL=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   .17806    CFS   UNIT VOLUME =    .9364       B =   526.28      P60 = 2.0100
    AREA =      .000045 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .131790HR    TP =   .133000HR    K/TP RATIO =   .990905     SHAPE CONSTANT, N =  3.563124
    UNIT PEAK =   .10993    CFS   UNIT VOLUME =    .8748       B =   324.91      P60 = 2.0100
    AREA =      .000045 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD                  ID=15   CODE=1

                                   HYDROGRAPH FROM AREA D3


    RUNOFF VOLUME =     1.44763 INCHES     =        .0069 ACRE-FEET
    PEAK DISCHARGE RATE =       .22 CFS  AT   1.500 HOURS   BASIN AREA =    .0001 SQ. MI.


**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D2 *********
COMPUTE NM HYD       ID=16 HYD=D2  AREA=0.00017 PER A=0.0 PER B=0.0
                                   PER C=100.0 PER D=0.0  TP=.133  RAINFALL=-1

    K =   .107204HR    TP =   .133000HR    K/TP RATIO =   .806046     SHAPE CONSTANT, N =  4.440701
    UNIT PEAK =   .49025    CFS   UNIT VOLUME =    .9780       B =   383.55      P60 = 2.0100
    AREA =      .000170 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD                  ID=16   CODE=1

                                   HYDROGRAPH FROM AREA D2


    RUNOFF VOLUME =     1.12613 INCHES     =        .0102 ACRE-FEET
    PEAK DISCHARGE RATE =        .35 CFS  AT   1.500 HOURS   BASIN AREA =    .0002 SQ. MI.



*
**********************************************************************
*DETERMINATION OF POND:
*******ROUTE BASIN C-5 THROUGH DETENTION POND
ROUTE RESERVOIR     ID=20 HYD=POND2 INFLOW ID=3  CODE=10
                    OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                        0              0           5020
                        1.34           0.308286    5022
                        1.64           0.499562    5023

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
```

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5020.00	.000	.00
.50	.00	5020.00	.000	.00
1.00	.00	5020.00	.000	.00
1.50	13.87	5020.95	.146	.64
2.00	3.07	5022.30	.366	1.43
2.50	.41	5022.26	.359	1.42
3.00	.14	5022.02	.311	1.34
3.50	.08	5021.71	.264	1.15
4.00	.07	5021.45	.223	.97
4.50	.06	5021.23	.189	.82
5.00	.07	5021.04	.160	.70
5.50	.07	5020.89	.137	.59
6.00	.08	5020.76	.117	.51
6.50	.00	5020.64	.099	.43
7.00	.00	5020.54	.083	.36
7.50	.00	5020.45	.069	.30
8.00	.00	5020.37	.058	.25

				Out
8.50	.00	5020.31	.048	.21
9.00	.00	5020.26	.040	.18
9.50	.00	5020.22	.034	.15
10.00	.00	5020.18	.028	.12
10.50	.00	5020.15	.024	.10
11.00	.00	5020.13	.020	.09
11.50	.00	5020.11	.016	.07
12.00	.00	5020.09	.014	.06
12.50	.00	5020.07	.011	.05
13.00	.00	5020.06	.010	.04
13.50	.00	5020.05	.008	.03
14.00	.00	5020.04	.007	.03
14.50	.00	5020.04	.006	.02
15.00	.00	5020.03	.005	.02
15.50	.00	5020.03	.004	.02
16.00	.00	5020.02	.003	.01
16.50	.00	5020.02	.003	.01
17.00	.00	5020.01	.002	.01
17.50	.00	5020.01	.002	.01
18.00	.00	5020.01	.002	.01
18.50	.00	5020.01	.001	.01
19.00	.00	5020.01	.001	.00

PEAK DISCHARGE = 1.449 CFS - PEAK OCCURS AT HOUR 2.15
MAXIMUM WATER SURFACE ELEVATION = 5022.364
MAXIMUM STORAGE = .3780 AC-FT INCREMENTAL TIME= .050000HRS

```
*
PRINT HYD            ID=20      CODE=1
```

HYDROGRAPH FROM AREA POND2

RUNOFF VOLUME = 1.78064 INCHES = .5033 ACRE-FEET
PEAK DISCHARGE RATE = 1.45 CFS AT 2.150 HOURS BASIN AREA = .0053 SQ. MI.

```
*
**** COMBINE HYDROGRAPHS FOR BASINS C5 AND C4**********
*S COMBINE HYDROGRAPHS FOR BASINS C5 AND C4
ADD HYD                 ID=21 HYD=21 ID I=20 ID II=4
*
PRINT HYD                   ID=21   CODE=1
```

OUTFLOW HYDROGRAPH REACH 21.00

RUNOFF VOLUME = 1.82883 INCHES = .6506 ACRE-FEET
PEAK DISCHARGE RATE = 4.58 CFS AT 1.500 HOURS BASIN AREA = .0067 SQ. MI.

```
*
**************************************************************
*DETERMINATION OF POND:
*******ROUTE BASIN B-2 THROUGH UNDERGROUND DETENTION POND
ROUTE RESERVOIR     ID=22 HYD=POND4A INFLOW ID=1  CODE=10
                    OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                    0             0               5028
                    1.82          0.293846        5030
                    2.03          0.367308        5030.5
```

* * * * * * * * * * * * * * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5028.00	.000	.00
.50	.00	5028.00	.000	.00
1.00	.00	5028.00	.000	.00
1.50	9.37	5028.66	.098	.60
2.00	2.07	5029.58	.232	1.44
2.50	.28	5029.42	.209	1.29
3.00	.09	5029.14	.167	1.04
3.50	.05	5028.90	.132	.82
4.00	.05	5028.71	.104	.64
4.50	.04	5028.56	.082	.51
5.00	.05	5028.44	.065	.40

				Out
5.50	.05	5028.35	.052	.32
6.00	.05	5028.29	.042	.26
6.50	.00	5028.23	.033	.21
7.00	.00	5028.18	.026	.16
7.50	.00	5028.14	.020	.12
8.00	.00	5028.11	.015	.10
8.50	.00	5028.08	.012	.07
9.00	.00	5028.06	.009	.06
9.50	.00	5028.05	.007	.04
10.00	.00	5028.04	.006	.03
10.50	.00	5028.03	.004	.03
11.00	.00	5028.02	.003	.02
11.50	.00	5028.02	.003	.02
12.00	.00	5028.01	.002	.01
12.50	.00	5028.01	.002	.01
13.00	.00	5028.01	.001	.01
13.50	.00	5028.01	.001	.01
14.00	.00	5028.00	.001	.00

PEAK DISCHARGE = 1.453 CFS - PEAK OCCURS AT HOUR 2.10
MAXIMUM WATER SURFACE ELEVATION = 5029.597
MAXIMUM STORAGE = .2346 AC-FT INCREMENTAL TIME= .050000HRS

```
*
PRINT HYD           ID=22      CODE=1
```

HYDROGRAPH FROM AREA POND4A

RUNOFF VOLUME = 1.78070 INCHES = .3400 ACRE-FEET
PEAK DISCHARGE RATE = 1.45 CFS AT 2.100 HOURS BASIN AREA = .0036 SQ. MI.

```
*
**** COMBINE HYDROGRAPHS FOR BASINS B2 AND C3**********
*S COMBINE HYDROGRAPHS FOR BASINS B2 AND C3
ADD HYD                 ID=23 HYD=23 ID I=22 ID II=2
*
PRINT HYD                   ID=23   CODE=1
```

OUTFLOW HYDROGRAPH REACH 23.00

RUNOFF VOLUME = 1.81301 INCHES = .4545 ACRE-FEET
PEAK DISCHARGE RATE = 3.72 CFS AT 1.500 HOURS BASIN AREA = .0047 SQ. MI.

```
*
**** COMBINE HYDROGRAPHS FOR BASINS B2+C3 AND C5+C4 **********
*S COMBINE HYDROGRAPHS FOR BASINS B2+C3 AND C5+C4
ADD HYD                 ID=24 HYD=24 ID I=23 ID II=21
*
PRINT HYD                   ID=24   CODE=1
```

OUTFLOW HYDROGRAPH REACH 24.00

RUNOFF VOLUME = 1.82229 INCHES = 1.1050 ACRE-FEET
PEAK DISCHARGE RATE = 8.30 CFS AT 1.500 HOURS BASIN AREA = .0114 SQ. MI.

```
*
**********************************************************************
*DETERMINATION OF POND:
*******ROUTE BASIN C-1 THROUGH DETENTION POND
ROUTE RESERVOIR     ID=25 HYD=POND5 INFLOW ID=5  CODE=10
                    OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                        0              0            5020
                        1.12           0.150931     5022
                        1.59           0.36632      5024

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

    TIME       INFLOW     ELEV       VOLUME     OUTFLOW
    (HRS)      (CFS)      (FEET)     (AC-FT)    (CFS)
```

				Out
.00	.00	5020.00	.000	.00
.50	.00	5020.00	.000	.00
1.00	.00	5020.00	.000	.00
1.50	7.49	5021.02	.077	.57
2.00	1.66	5022.27	.180	1.18
2.50	.22	5022.08	.160	1.14
3.00	.07	5021.62	.122	.91
3.50	.04	5021.21	.092	.68
4.00	.04	5020.91	.069	.51
4.50	.03	5020.69	.052	.39
5.00	.04	5020.52	.039	.29
5.50	.04	5020.40	.030	.23
6.00	.04	5020.32	.024	.18
6.50	.00	5020.24	.018	.13
7.00	.00	5020.18	.013	.10
7.50	.00	5020.13	.010	.07
8.00	.00	5020.10	.007	.05
8.50	.00	5020.07	.005	.04
9.00	.00	5020.05	.004	.03
9.50	.00	5020.04	.003	.02
10.00	.00	5020.03	.002	.02
10.50	.00	5020.02	.002	.01
11.00	.00	5020.02	.001	.01
11.50	.00	5020.01	.001	.01
12.00	.00	5020.01	.001	.00

PEAK DISCHARGE = 1.188 CFS - PEAK OCCURS AT HOUR 2.10
MAXIMUM WATER SURFACE ELEVATION = 5022.290
MAXIMUM STORAGE = .1822 AC-FT INCREMENTAL TIME= .050000HRS

*
PRINT HYD ID=25 CODE=1

HYDROGRAPH FROM AREA POND5

RUNOFF VOLUME = 1.78068 INCHES = .2716 ACRE-FEET
PEAK DISCHARGE RATE = 1.19 CFS AT 2.100 HOURS BASIN AREA = .0029 SQ. MI.

*
**** COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1**********
*S COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1
ADD HYD ID=26 HYD=26 ID I=24 ID II=25
*
PRINT HYD ID=26 CODE=1

OUTFLOW HYDROGRAPH REACH 26.00

RUNOFF VOLUME = 1.81375 INCHES = 1.3765 ACRE-FEET
PEAK DISCHARGE RATE = 8.87 CFS AT 1.500 HOURS BASIN AREA = .0142 SQ. MI..

*
**** COMBINE HYDROGRAPHS FOR BASINS B3 AND B1**********
*S COMBINE HYDROGRAPHS FOR BASINS B3 AND B1
ADD HYD ID=28 HYD=28 ID I=11 ID II=7
*
PRINT HYD ID=28 CODE=1

OUTFLOW HYDROGRAPH REACH 28.00

RUNOFF VOLUME = 1.76381 INCHES = .7516 ACRE-FEET
PEAK DISCHARGE RATE = 20.77 CFS AT 1.500 HOURS BASIN AREA = .0080 SQ. MI.

*
****
*DETERMINATION OF POND:
*******ROUTE BASIN B1+B3 THROUGH DETENTION POND
ROUTE RESERVOIR ID=29 HYD=POND4 INFLOW ID=28 CODE=10
OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
0 0 5022
4.09 0.607206 5024

				Out
	4.58		0.759008	5024.5

* * * * * * * * * * * * * * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5022.00	.000	.00
.50	.00	5022.00	.000	.00
1.00	.00	5022.00	.000	.00
1.50	20.77	5022.71	.215	1.45
2.00	4.56	5023.66	.503	3.39
2.50	.61	5023.47	.445	3.00
3.00	.21	5023.15	.349	2.35
3.50	.12	5022.89	.270	1.82
4.00	.10	5022.69	.208	1.40
4.50	.09	5022.53	.161	1.09
5.00	.10	5022.41	.126	.85
5.50	.11	5022.33	.099	.66
6.00	.12	5022.26	.079	.53
6.50	.01	5022.20	.061	.41
7.00	.00	5022.15	.046	.31
7.50	.00	5022.12	.035	.24
8.00	.00	5022.09	.027	.18
8.50	.00	5022.07	.020	.14
9.00	.00	5022.05	.015	.10
9.50	.00	5022.04	.012	.08
10.00	.00	5022.03	.009	.06
10.50	.00	5022.02	.007	.04
11.00	.00	5022.02	.005	.03
11.50	.00	5022.01	.004	.03
12.00	.00	5022.01	.003	.02
12.50	.00	5022.01	.002	.01
13.00	.00	5022.01	.002	.01
13.50	.00	5022.00	.001	.01
14.00	.00	5022.00	.001	.01
14.50	.00	5022.00	.001	.00

PEAK DISCHARGE = 3.422 CFS - PEAK OCCURS AT HOUR 2.10
MAXIMUM WATER SURFACE ELEVATION = 5023.673
MAXIMUM STORAGE = .5080 AC-FT INCREMENTAL TIME= .050000HRS

*
PRINT HYD ID=29 CODE=1

HYDROGRAPH FROM AREA POND4

RUNOFF VOLUME = 1.76380 INCHES = .7516 ACRE-FEET
PEAK DISCHARGE RATE = 3.42 CFS AT 2.100 HOURS BASIN AREA = .0080 SQ. MI.

*
**** COMBINE HYDROGRAPHS FOR BASINS A2 AND A1**********
*S COMBINE HYDROGRAPHS FOR BASINS A2 AND A1
ADD HYD ID=30 HYD=30 ID I=12 ID II=9
*
PRINT HYD ID=30 CODE=1

OUTFLOW HYDROGRAPH REACH 30.00

RUNOFF VOLUME = 1.74826 INCHES = .3767 ACRE-FEET
PEAK DISCHARGE RATE = 10.46 CFS AT 1.500 HOURS BASIN AREA = .0040 SQ. MI.

AFTER POND ROUTING

*
**** COMBINE HYDROGRAPHS FOR BASINS B1+B3 AND A1+A2 **********
*S COMBINE HYDROGRAPHS FOR BASINS B1+B3 AND A1+A2+D1
ADD HYD ID=31 HYD=31 ID I=30 ID II=29
ADD HYD ID=32 HYD=32 ID I=31 ID II=10
*
PRINT HYD ID=32 CODE=1

OUTFLOW HYDROGRAPH REACH 32.00

```
                                                    Out
    RUNOFF VOLUME =      1.76287 INCHES      =        1.4178 ACRE-FEET
    PEAK DISCHARGE RATE =       19.90 CFS  AT    1.500 HOURS    BASIN AREA =    .0151 SQ. MI.


*
**********************************************************************
*DETERMINATION OF POND:
*******ROUTE NORTH BASINS THROUGH DETENTION POND
ROUTE RESERVOIR      ID=33 HYD=POND3 INFLOW ID=32  CODE=10
                     OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                         0              0           5008
                         4.53              0.214141    5010
                                  6.40           0.531449    5012
                                  7.84           0.964482    5014

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

    TIME       INFLOW     ELEV       VOLUME     OUTFLOW
    (HRS)      (CFS)      (FEET)     (AC-FT)    (CFS)

      .00         .00    5008.00        .000        .00
      .50         .00    5008.00        .000        .00
     1.00         .00    5008.00        .000        .00
     1.50       19.90    5009.70        .182       3.85
     2.00        7.44    5011.41        .437       5.85
     2.50        3.54    5011.17        .401       5.63
     3.00        2.53    5010.56        .303       5.05
     3.50        1.92    5009.86        .199       4.20
     4.00        1.49    5009.20        .129       2.72
     4.50        1.17    5008.84        .089       1.89
     5.00         .93    5008.61        .066       1.39
     5.50         .76    5008.47        .050       1.06
     6.00         .63    5008.37        .040        .84
     6.50         :42    5008.28        .030        .64
     7.00         .31    5008.21        .022        .47
     7.50         .24    5008.16        .017        .35
     8.00         .18    5008.12        .013        .26
     8.50         .14    5008.09        .009        .20
     9.00         .10    5008.07        .007        .15
     9.50         .08    5008.05        .005        .11
    10.00         .06    5008.04        .004        .09
    10.50         .04    5008.03        .003        .07
    11.00         .03    5008.02        .002        .05
    11.50         .03    5008.02        .002        .04
    12.00         .02    5008.01        .001        .03
    12.50         .01    5008.01        .001        .02
    13.00         .01    5008.01        .001        .02
    13.50         .01    5008.01        .001        .01
    14.00         .01    5008.00        .000        .01
    14.50         .00    5008.00        .000        .01
    15.00         .00    5008.00        .000        .01
    15.50         .00    5008.00        .000        .00
PEAK DISCHARGE =         5.896 CFS - PEAK OCCURS AT HOUR    2.10
MAXIMUM WATER SURFACE ELEVATION =     5011.461
MAXIMUM STORAGE =           .4460 AC-FT      INCREMENTAL TIME=     .050000HRS

*
PRINT HYD            ID=33      CODE=1

                                        HYDROGRAPH FROM AREA POND3


    RUNOFF VOLUME =      1.76287 INCHES      =        1.4178 ACRE-FEET
    PEAK DISCHARGE RATE =       5.90 CFS  AT    2.100 HOURS    BASIN AREA =    .0151 SQ. MI.


*
**** COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 **********
*S COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2
ADD HYD                  ID=34 HYD=34 ID I=13 ID II=14
ADD HYD                  ID=35 HYD=35 ID I=15 ID II=16
ADD HYD                  ID=36 HYD=36 ID I=34 ID II=35
*
PRINT HYD                   ID=36   CODE=1

                                    OUTFLOW HYDROGRAPH REACH    36.00
```

RUNOFF VOLUME = 1.06682 INCHES = .0637 ACRE-FEET
PEAK DISCHARGE RATE = 2.01 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

```
*
**** COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 AND NORTH BASINS**********
*S COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 AND NORTH BASINS
ADD HYD                 ID=37 HYD=37 ID I=33 ID II=36
*
PRINT HYD                   ID=37   CODE=1
```

. OUTFLOW HYDROGRAPH REACH 37.00

RUNOFF VOLUME = 1.71469 INCHES = 1.4815 ACRE-FEET
PEAK DISCHARGE RATE = 6.53 CFS AT 1.550 HOURS BASIN AREA = .0162 SQ. MI.

```
FINISH
```

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:19:49

BASIN	TOTAL AREA (ac)	PROPOSED LAND TREATMENT AREAS A (ac)	B (ac)	C (ac)	D (ac)	PEAK DISCHARGE RATE A (cfs/ac)		B (cfs/ac)		C (cfs/ac)		D (cfs/ac)		PROPOSED PEAK DISCHARGE 10 YR (cfs)	100 YR (cfs)	EXISTING PEAK DISCHARGE 10 YR (cfs)	100 YR (cfs)
PHASE I																	
OFFSITE BASINS																	
A-2	0.13	0.00	0.00	0.13	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.22	0 41	0.00	0.41
A-5	0.28	0.00	0.14	0.00	0.13	0.38	1.56	0.95	2.28	1.71	3.14	3 14	4.70	0.57	0.98	0.13	0.76
B-3	0.1	0.00	0.05	0.05	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.13	0.27	0.05	0.27
C-2	0.36	0.18	0.18	0.00	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.24	0.69	0.24	0.69
D-3	0.06	0.00	0.03	0.00	0.03	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.12	0.21	0.02	0.09
I-2	0.28	0.00	0.08	0.00	0.18	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.70	1.11	0.11	0 44
	1.21													1.99	3.67	0.55	2.66
ON-SITE BASINS																	
A-1	2.46	0.00	0.25	0.49	1.72	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	6.48	10.20	1.43	4.42
A-3	0.27	0.24	0.00	0.03	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.14	0.46	0.14	0.46
A-4	0.83	0.00	0.00	0.08	0.76	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.49	3.77	0.84	1.92
B-1	5.01	0.00	0.50	1.00	3.48	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	13 20	20.77	3.00	9.15
B-2	2.29	0.00	0.23	0.46	1.60	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	6.03	9.49	1.37	4.18
C-1	1.83	0.00	0.18	0.37	1.29	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	4.82	7.59	1.22	3.49
C-3	0.72	0.00	0.00	0.16	0.65	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.05	3.16	0 43	1.31
C-4	0.88	0.00	0.00	0.08	0.69	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.64	4.00	0.70	1.82
C-5	3.39	0.34	0.00	0.68	2.38	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	8.74	13.81	3.83	8.33
D-1	1.95	0.19	0.00	0.39	1.36	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	5.03	7.94	1 17	3.56
D-2	0.11	0.00	0.00	0.11	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.19	0.35	0.04	0.17
D-4	0.08	0.00	0.01	0.07	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.13	0.24	0.11	0.22
E-1	0.48	0.00	0.07	0.41	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.77	1.45	0.29	0.88
E-2	0.12	0.00	0.05	0.07	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.17	0.34	0.16	0.33
F-1	1.02	0.00	0.14	0.82	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.63	3.07	1.21	2.58
F-2	0.34	0.00	0.00	0.34	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.58	1.07	0.53	1.01
F-3	0.08	0.00	0.00	0.08	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.14	0.25	0.08	0.19
G-1	0.26	0.00	0.08	0.18	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.39	0.75	0.35	0.70
H-1	0.87	0.00	0.08	0.71	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.42	2.66	1.18	2.38
H-2	0.15	0.00	0.00	0.28	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.26	0.47	0.24	0.45
I-1	0.88	0.00	0.12	0.22	0.78	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.32	3.65	1.05	2.23
I-3	0.7	0.00	0.06	0.52	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.14	2.14	0.86	1.81
I-4	0.19	0.00	0.02	0.09	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.30	0.56	0 30	0.56
	24.91													61.05	98.18	20.53	52.15
Total	**26.12**													**63.04**	**101.85**	**21.08**	**54.81**

10% 10% 20% 70% 70% 30%

? Footprints of Buildings

LAND TREATMENT FACTORS

10-YR STORM DISCHARGE (cfs/acre)

CURRENT CONDITIONS

BASIN	AREA (ACRES)	% LAND TREATMENT* A	B	C	D	10-YR DISCHARGE - (CFS/ACRE)** 0.38	0.95	1.71	3.14	Q(10-YR) UNDEVELOPED (CFS)
OFF SITE										
A-2	0.13	0.00	0.00	100.00	0 00	0 38	0 95	1.71	3.14	0.22
A-5	0 28	0.00	50 00	50.00	0.00	0.38	0 95	1 71	3.14	0 37
B-3	0 10	0 00	50 00	50.00	0 00	0 38	0 95	1 71	3 14	0.13
C-2	0.36	50.00	50 00	0.00	0 00	0 38	0.95	1 71	3 14	0.24
D-3	0.06	100.00	0 00	0 00	0 00	0.38	0 95	1.71	3.14	0.02
I-2	0 28	100 00	0 00	0 00	0.00	0 38	0 95	1 71	3.14	0.11
ON SITE										
A-1	2 46	85.00	0.00	15 00	0.00	0.38	0 95	1 71	3.14	1.43
A-3	0 27	90 00	0.00	10.00	0 00	0.38	0 95	1 71	3 14	0 14
A-4	0 83	34 00	33.00	33 00	0.00	0 38	0.95	1 71	3.14	0 84
B-1	5.01	75 00	15 00	10.00	0 00	0.38	0 95	1 71	3 14	3 00
B-2	2.29	75.00	15.00	10 00	0.00	0 38	0.95	1 71	3.14	1.37
C-1	1 83	70 00	15 00	15 00	0.00	0 38	0 95	1 71	3.14	1 22
C-3	0.72	75 00	15 00	10.00	0 00	0 38	0 95	1 71	3.14	0 43
C-4	0 88	60 00	15 00	25 00	0 00	0.38	0.95	1.71	3.14	0.70
C-5	3.39	35.00	15.00	50.00	0.00	0 38	0 95	1.71	3 14	3 83
D-1	1 95	75 00	15 00	10 00	0.00	0.38	0.95	1 71	3.14	1.17
D-2	0 11	100.00	0 00	0.00	0 00	0 38	0.95	1.71	3 14	0.04
D-4	0.08	0 00	50 00	50 00	0 00	0.38	0.95	1 71	3 14	0 11
E-1	0.48	75 00	15 00	10.00	0.00	0.38	0.95	1 71	3.14	0 29
E-2	0 12	0 00	50.00	50.00	0 00	0.38	0.95	1.71	3.14	0 16
F-1	1 02	25.00	25 00	50.00	0 00	0.38	0 95	1.71	3.14	1.21
F-2	0 34	0.00	20.00	80.00	0.00	0 38	0 95	1.71	3.14	0.53
F-3	0 08	34 00	33 00	33 00	0.00	0 38	0.95	1.71	3.14	0.08
G-1	0.26	20.00	15.00	65.00	0.00	0.38	0.95	1.71	3 14	0.35
H-1	0.87	15.00	20.00	65.00	0.00	0.38	0 95	1.71	3.14	1 18
H-2	0.15	0 00	15.00	85 00	0.00	0 38	0.95	1.71	3.14	0.24
I-1	0.88	25.00	25.00	50.00	0.00	0.38	0.95	1.71	3.14	1 05
I-3	0.70	30.00	10.00	60.00	0 00	0 38	0 95	1.71	3.14	0 88
I-4	0.19	0.00	20.00	80 00	0 00	0.38	0.95	1.71	3 14	0.30
										21.80

DEVELOPED

BASIN	AREA (ACRES)	% LAND TREATMENT* A	B	C	D	10-YR DISCHARGE - (CFS/ACRE)** 0.38	0 95	1.71	3.14	Q(10-YR) DEVELOPED (CFS)
OFF SITE										
A-2	0.13	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.22
A-5	0.28	0 00	50.00	0.00	50.00	0.38	0.95	1 71	3.14	0.57
B-3	0.10	0 00	50.00	50.00	0 00	0.38	0.95	1.71	3.14	0.13
C-2	0.36	50.00	50.00	0.00	0.00	0.38	0.95	1.71	3.14	0.24
D-3	0.06	0 00	50.00	0.00	50.00	0.38	0.95	1.71	3.14	0.12
I-2	0.28	0.00	30.00	0.00	70 00	0.38	0.95	1.71	3.14	0.70
ON SITE										
A-1	2.46	0 00	10.00	20.00	70.00	0.38	0.95	1 71	3.14	6.48
A-3	0 27	90.00	0.00	10.00	0.00	0.38	0 95	1.71	3.14	0.14
A-4	0 83	0.00	0 00	10.00	90.00	0.38	0.95	1.71	3.14	2.49
B-1	5.01	0.00	10.00	20.00	70.00	0.38	0.95	1.71	3.14	13.20
B-2	2.29	0 00	10.00	20.00	70.00	0 38	0.95	1.71	3.14	6.03
C-1	1.83	0 00	10 00	20 00	70 00	0.38	0.95	1.71	3.14	4.82
C-3	0.72	0 00	0.00	20.00	80.00	0.38	0.95	1.71	3.14	2.06
C-4	0.88	0 00	0.00	10 00	90.00	0.38	0 95	1.71	3.14	2.64
C-5	3.39	10.00	0.00	20.00	70.00	0.38	0.95	1.71	3.14	8.74
D-1	1.95	10.00	0.00	20.00	70.00	0.38	0 95	1.71	3.14	5.03
D-2	0.11	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.19
D-4	0 08	0 00	10 00	90.00	0.00	0 38	0.95	1.71	3.14	0.13
E-1	0.48	0.00	15.00	85.00	0.00	0.38	0.95	1.71	3.14	0 77
E-2	0.12	0 00	40.00	60.00	0.00	0.38	0.95	1.71	3.14	0.17
F-1	1.02	0.00	15.00	85.00	0.00	0.38	0.95	1.71	3.14	1.63
F-2	0.34	0.00	0.00	100.00	0.00	0.38	0.95	1 71	3 14	0 58
F-3	0 08	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.14
G-1	0.26	0.00	30.00	70.00	0 00	0.38	0.95	1.71	3.14	0.39
H-1	0 87	0.00	10.00	90.00	0.00	0.38	0.95	1.71	3.14	1.42
H-2	0.15	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.26
I-1	0.88	0.00	10.00	20.00	70.00	0.38	0.95	1.71	3.14	2.32
I-3	0.70	0.00	10.00	90.00	0.00	0.38	0 95	1.71	3.14	1.14
I-4	0.19	0.00	20.00	80.00	0.00	0.38	0.95	1.71	3.14	0.30
										63.03

TOTAL 10-YEAR STORM DISCHARGE (DEVELOPED) **63.03**

PEAK DISCHARGE (cfs/acre)

CURRENT CONDITIONS

BASIN	AREA (ACRES)	% LAND TREATMENT* A	B	C	D	PEAK DISCHARGE - (CFS/ACRE)** 1 56	2 28	3 14	4 7	Q(100-YR) UNDEVELOPED (CFS)
OFF SITE										
A-2	0.13	0 00	0.00	100.00	0 00	1 56	2 28	3.14	4 7	0.41
A-5	0 28	0 00	50 00	50 00	0 00	1 56	2 28	3 14	4 7	0.76
B-3	0 10	0 00	50 00	50 00	0 00	1 56	2 28	3 14	4.7	0 27
C-2	0 36	50 00	50 00	0 00	0 00	1 56	2 28	3.14	4 7	0 69
D-3	0 06	100 00	0 00	0 00	0 00	1 56	2 28	3 14	4 7	0 09
I-2	0 28	100 00	0 00	0 00	0.00	1 56	2 28	3 14	4 7	0 44
ON SITE										
A-1	2 46	85 00	0 00	15 00	0 00	1 56	2 28	3 14	4.7	4 42
A-3	0 27	90 00	0 00	10 00	0 00	1.56	2 28	3 14	4 7	0 46
A-4	0 83	34 00	33 00	33 00	0 00	1 56	2 28	3.14	4.7	1 92
B-1	5 01	75 00	15 00	10 00	0 00	1 56	2 28	3 14	4.7	9 15
B-2	2 29	75 00	15 00	10 00	0 00	1 56	2 28	3 14	4.7	4 18
C-1	1 83	70 00	15 00	15 00	0 00	1 56	2 28	3.14	4 7	3 49
C-3	0 72	75 00	15 00	10 00	0 00	1.56	2 28	3.14	4 7	1 31
C-4	0 88	60 00	15 00	25 00	0 00	1 56	2 28	3.14	4 7	1 82
C-5	3 39	35.00	15 00	50 00	0 00	1 56	2.28	3 14	4 7	8 33
D-1	1 95	75.00	15 00	10 00	0 00	1 56	2 28	3 14	4.7	3 56
D-2	0 11	100 00	0 00	0.00	0.00	1.56	2 28	3.14	4 7	0.17
D-4	0 08	0 00	50 00	50 00	0 00	1 56	2 28	3.14	4 7	0 22
E-1	0 48	75 00	15 00	10 00	0 00	1.56	2 28	3 14	4.7	0.88
E-2	0 12	0 00	50 00	50 00	0 00	1 56	2 28	3.14	4 7	0 33
F-1	1 02	25 00	25.00	50 00	0.00	1 56	2 28	3.14	4.7	2 58
F-2	0.34	0 00	20 00	80 00	0 00	1.56	2.28	3 14	4.7	1.01
F-3	0 06	34 00	33.00	33 00	0.00	1 56	2 28	3 14	4.7	0 19
G-1	0 26	20 00	15.00	65.00	0.00	1 56	2 28	3 14	4.7	0 70
H-1	0 87	15 00	20.00	65 00	0 00	1 56	2 28	3 14	4 7	2 38
H-2	0 15	0 00	15.00	85 00	0 00	1 56	2 28	3 14	4 7	0 45
I-1	0 88	25 00	25 00	50 00	0 00	1 56	2 28	3 14	4 7	2.23
I-3	0.70	30 00	10.00	60 00	0.00	1 56	2.28	3 14	4.7	1 81
I-4	0.19	0 00	20.00	80 00	0.00	1.56	2 28	3 14	4 7	0 56
										54.80

DEVELOPED

BASIN	AREA (ACRES)	% LAND TREATMENT* A	B	C	D	PEAK DISCHARGE - (CFS/ACRE)** 1 56	2 28	3.14	4.7	Q(100-YR) DEVELOPED (CFS)
OFF SITE										
A-2	0 13	0 00	0 00	100.00	0 00	1 56	2 28	3 14	4.7	0 41
A-5	0 28	0 00	50 00	0 00	50.00	1 56	2.28	3 14	4.7	0 98
B-3	0.10	0.00	50.00	50 00	0.00	1.56	2.28	3 14	4.7	0.27
C-2	0.36	50 00	50.00	0 00	0 00	1 56	2.28	3 14	4.7	0 69
D-3	0.06	0.00	50.00	0.00	50.00	1 56	2.28	3 14	4.7	0 21
I-2	0.28	0 00	30.00	0.00	70 00	1 56	2.28	3 14	4 7	1 11
ON SITE										
A-1	2.46	0 00	10.00	20 00	70 00	1 56	2 28	3 14	4 7	10 20
A-3	0.27	90.00	0.00	10.00	0.00	1.56	2.28	3 14	4 7	0.46
A-4	0 83	0 00	0 00	10 00	90 00	1 56	2.28	3.14	4.7	3.77
B-1	5.01	0 00	10.00	20.00	70.00	1 56	2 28	3 14	4 7	20.77
B-2	2.29	0 00	10 00	20 00	70 00	1 56	2 28	3.14	4.7	9.49
C-1	1.83	0.00	10.00	20.00	70.00	1.56	2.28	3.14	4 7	7.59
C-3	0 72	0 00	0 00	20 00	80 00	1 56	2 28	3 14	4.7	3.16
C-4	0.88	0.00	0.00	10.00	90.00	1 56	2.28	3.14	4.7	4.00
C-5	3.39	10.00	0 00	20 00	70.00	1 56	2.28	3.14	4.7	13.81
D-1	1.95	10.00	0.00	20 00	70.00	1 56	2.28	3.14	4.7	7.94
D-2	0.11	0.00	0.00	100 00	0.00	1 56	2.28	3 14	4.7	0.35
D-4	0.08	0.00	10.00	90.00	0.00	1.56	2.28	3.14	4.7	0.24
E-1	0.48	0.00	15.00	85 00	0 00	1 56	2.28	3.14	4.7	1.45
E-2	0.12	0.00	40.00	60 00	0.00	1 56	2.28	3.14	4.7	0.34
F-1	1 02	0 00	15 00	85 00	0 00	1 56	2.28	3 14	4.7	3 07
F-2	0.34	0.00	0.00	100.00	0.00	1 56	2.28	3.14	4.7	1.07
F-3	0 08	0 00	0 00	100.00	0.00	1 56	2 28	3 14	4.7	0 25
G-1	0.26	0.00	30.00	70.00	0.00	1 56	2.28	3.14	4.7	0.75
H-1	0 87	0 00	10 00	90 00	0.00	1 56	2 28	3.14	4.7	2 66
H-2	0.15	0 00	0.00	100.00	0.00	1 56	2 28	3.14	4.7	0 47
I-1	0 88	0 00	10 00	20.00	70 00	1 56	2 28	3.14	4 7	3 65
I-3	0.70	0 00	10.00	90.00	0.00	1 56	2 28	3.14	4 7	2 14
I-4	0.19	0 00	20.00	80.00	0.00	1 56	2.28	3.14	4.7	0.56
										101.86

TOTAL 100-YEAR STORM DISCHARGE (DEVELOPED) **101.86**

Note —
O's are stuff
off from Thrust
shown in TABLE 3

Pond 2 (Max. allow. rel.=1.75) 100 Yr. WSE=5022.36

Elevation	Area ft^2	Avg Area ft^2	Increment Vol ft^3	Cum Vol ft^3	Cum Vol ac-ft	H ft	Q cfs	d (ft)=	0.5
5020	5663		0	0	0	0	0		
5022	7766	6714.5	13429	13429	0.308286217	2	1.34		
5023	8898	8332	8332	21761	0.49956187	3	1.64		

Pond 3 (Max. allow. rel.=4.20 and 4.69-Pond 4) 100 Yr. WSE=5011.46

Elevation	Area ft^2	Avg Area ft^2	Increment Vol ft^3	Cum Vol ft^3	Cum Vol ac-ft	H ft	Q cfs	d (ft)=	0.92
5880	3614		0	0	0	0	0		
5010	5714	4664	9328	9328	0.214140578	2	4.53		
5012	8108	6911	13822	23150	0.531448798	4	6.40		
5014	10755	9431.5	18863	42013	0.964482003	6	7.84		

Pond 5 (Max. allow. rel.=1.76) 100 Yr. WSE=5022.29

Elevation	Area ft^2	Avg Area ft^2	Increment Vol ft^3	Cum Vol ft^3	Cum Vol ac-ft	H ft	Q cfs	d (ft)=	0.458
5020	2643.5		0	0	0	0	0		
5022	3931.1	3287.3	6574.6	6574.6	0.150931459	2	1.12		
5024	5451.25	4691.175	9382.35	15956.95	0.366319737	4	1.59		

Pond 4 (Max. allow. rel.=4.68) 100 Yr. WSE=5023.67

Elevation	Area ft^2	Avg Area ft^2	Increment Vol ft^3	Cum Vol ft^3	Cum Vol ac-ft	H ft	Q cfs	d (ft)=	0.875
5022	13225		0	0	0	0	0		
5024	13225	13225	26450	26450	0.607206078	2	4.09		
5024.5	13225	13225	6612.5	33062.5	0.759007598	2.5	4.58		

Pond 4A (Max. allow. rel.=2.09) 100 Yr. WSE=5029.60

Elevation	Area ft^2	Avg Area ft^2	Increment Vol ft^3	Cum Vol ft^3	Cum Vol ac-ft	H ft	Q cfs	d (ft)=	0.583
5028	6400		0	0	0	0	0		
5030	6400	6400	12800	12800	0.29384642	2	1.82		
5030.5	6400	6400	3200	16000	0.367308025	2.5	2.03		

APPENDIX C

STREET FLOW, INLET, STORM DRAIN AND CHANNEL CALCULATIONS

CATCH BASIN CALCULATION SHEET

PROJECT GATEWAY Shl__of__

DESIGN FREQUENCY 100 YEAR CALCULATED BY CAB

DATE 7-6-98

Sym.	Drain. Area	Q Total	Q Inter.	Cap. of ½ Street	Gutter "d"	C.B. No.	C.B. Size	Connector Pipe Head	Connector Pipe L	Connector Pipe Dia.	V Depth
11		4.6			.39	1	DBL "C"		49.1	18	7.34'
10A		2.4			.32	1	DBL "C"		24.4	18"	4.02'
8		1.3			.27	1	DBL "C"		30'	24"	4.46'

FLOW DIAGRAM (Indicate street slopes)

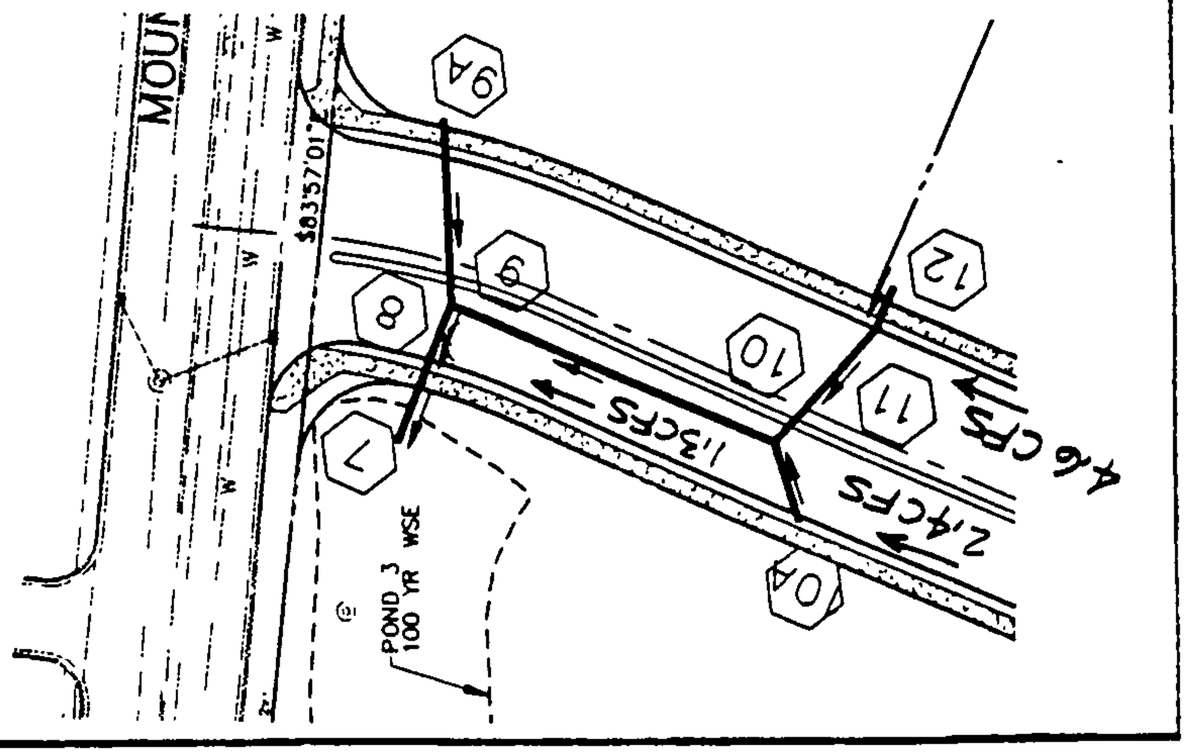


PLATE 22.3 D-10

CATCH BASIN CALCULATION SHEET

PROJECT GATEWAY Sht 1 of 1

DESIGN FREQUENCY 100 YEAR

CALCULATED BY CAB

DATE 7-6-98

Sym.	Drain. Area	Q Total	Q Inter.	Cap. of Street	Gutter "d"	C.B. No.	C.B. Size	Connector Pipe Head	Connector Pipe L	Connector Pipe Dia.	V Depth
3		0.88	0.88		.19	1	DBL "C"		202.8'	18"	3.8'
2A		2.4	2.4		.36	1	DBL "C"		7.1'	18"	3.8'
1B		2.3	2.3		.38	1	DBL "C"		74.7'	18"	2.99'
1A		2.1	2.1		.36	1	DBL "C"		26.1'	18"	3.0

FLOW DIAGRAM

(Indicate street slopes)

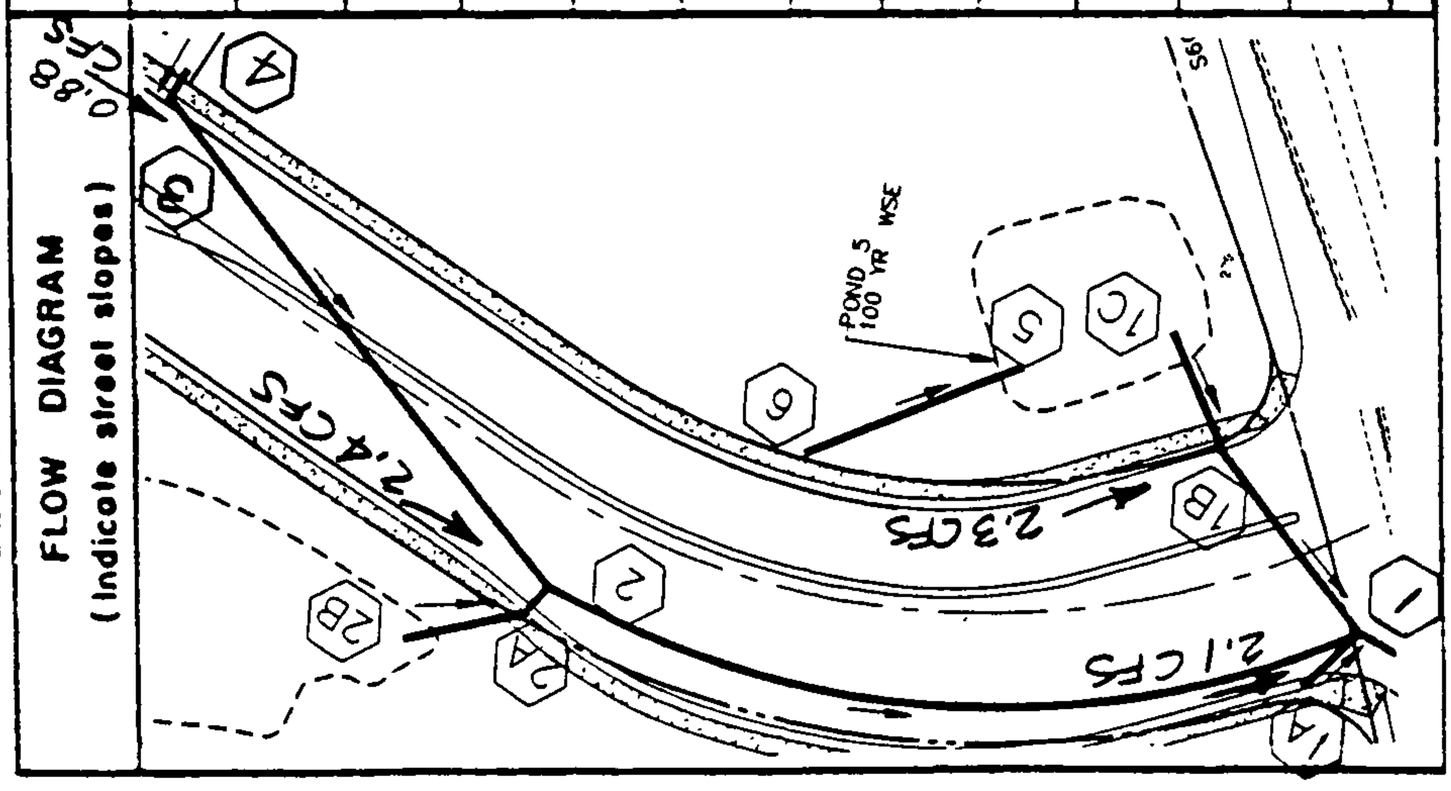
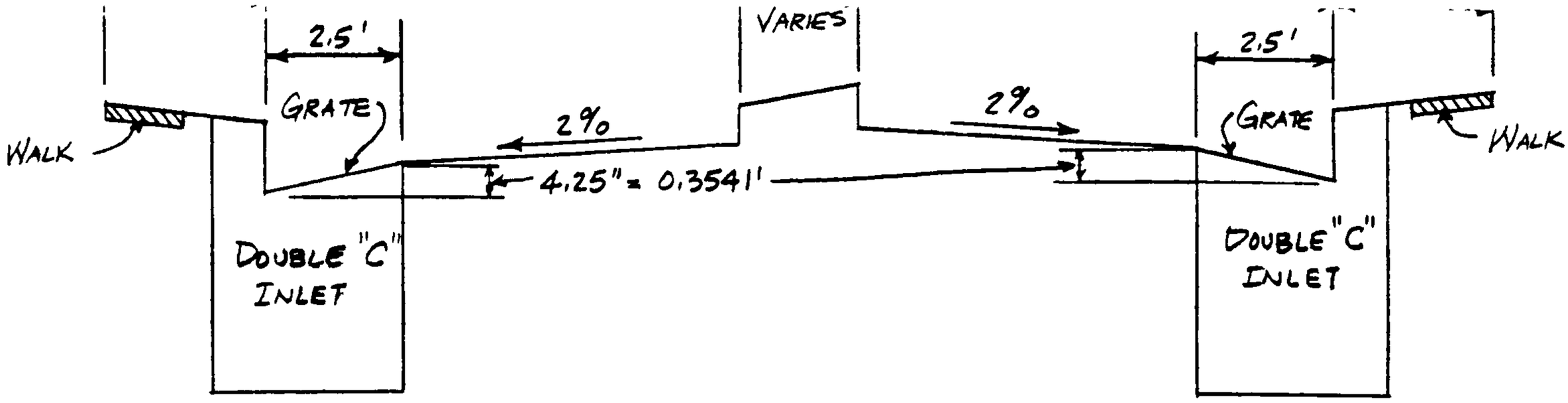


PLATE 22.3 D-10



STRUCTURE 3

Q_{TOTAL} = 0.88 CFS
d = 0.19'
V = 2.4 fps
S = 0.0269
SPREAD = < 2.5'
$Q_{cap.}$ = 1.5 CFS

STRUCTURE 2A

Q_{TOTAL} = 2.4 CFS
d = 0.36'
V = 1.3 fps
S = 0.0269
SPREAD = 2.8'
Q_{cap} = 5.1 CFS

STRUCTURE 1B

Q_{TOTAL} = 2.3 CFS
d = 0.38'
V = 1.1 fps
S = 0.0156
SPREAD = 3.8'
Q_{cap} = 4.6 CFS

STRUCTURE 1A

Q_{TOTAL} = 2.1 CFS
d = 0.36'
V = 1.0 fps
S = 0.0156
SPREAD = 2.8'
Q_{cap} = 4.0 CFS

STRUCTURE 1I

Q_{TOTAL} = 4.6 CFS
d = 0.39'
V = 1.9 fps
S = 0.058
SPREAD = 4.3'
Q_{cap} = 8.0 CFS

STRUCTURE 10A

Q_{TOTAL} = 2.4 CFS
d = 0.32'
V = 1.7 fps
S = 0.058
SPREAD = < 2.5'
Q_{cap} = 5.6 CFS

STRUCTURE 8

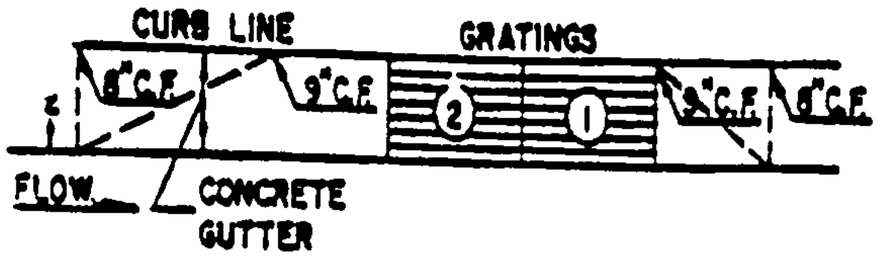
Q_{TOTAL} = 1.3 CFS
d = 0.27'
V = 1.5 fps
S = 0.058
SPREAD = < 2.5'
Q_{cap} = 3.8 CFS

Bohannan ▲ Huston

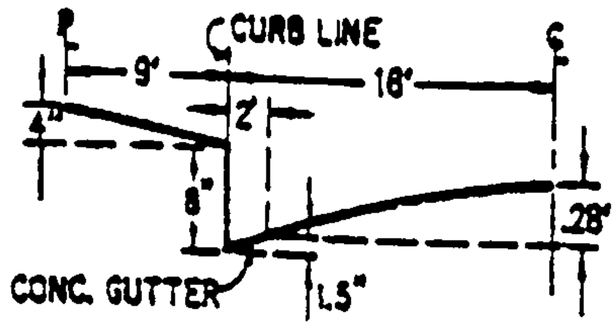
PROJECT NAME GATEWAY
PROJECT NO 97286
SUBJECT

SHEET OF
BY CAB DATE 7-7-98
CH'D DATE

GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

PLATE 22.3 D-6

STREET CAPACITY

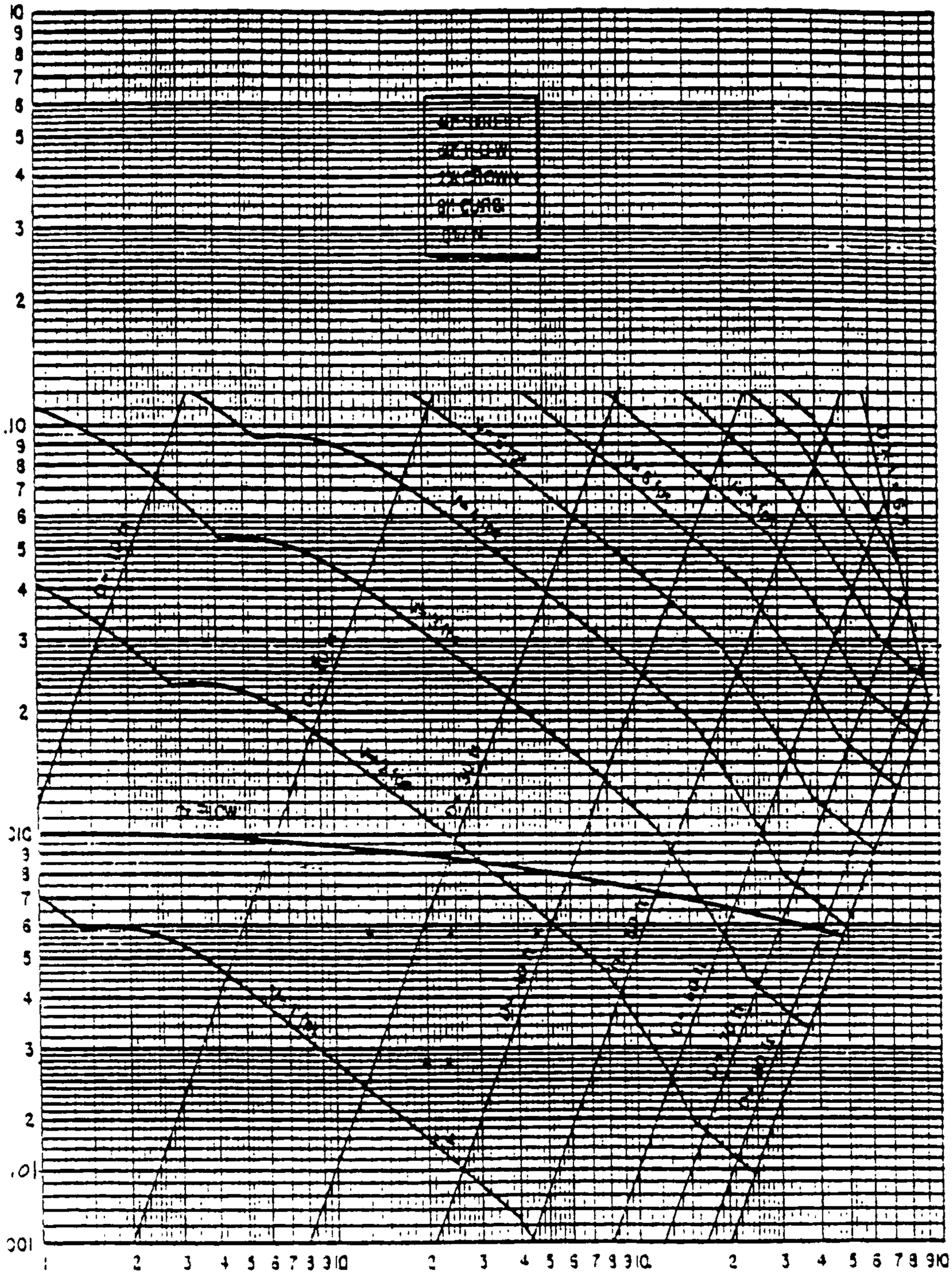


PLATE 22.3 D-3

FROM POINT	TO POINT	AREA	Q (CFS)		INVERT ELEV.		LENGTH	SLOPE	DIA.	CAPACITY	VELOCITY
		ACRES	INCR.	ACCUM.	UPPER	LOWER	FEET	FT/FT	INCHES	CFS	FPS
4	3		2.0	2.0	5028.0	5027.55	14.2	.0317	12" PVC	7.5	8.1
3	2		0.88	2.88	5027.45	5019.62	202.8	.0386	18"	20.6	8.2
(FROM 2A)			4.0	6.88	—	—	—	—	—	—	—
2	1		—	6.88	5019.52	5013.25	285.4	.0220	18"	15.6	8.5
(FROM 1A)			2.1	8.98	—	—	—	—	—	—	—
(FROM 1B)			3.88	12.86	—	—	—	—	—	—	—
1	EX.20		—	12.86	5010.00	5000.00	88.7	.1127	18"	35.3	18.4
2B	2A		1.6	1.6	5020.00	5019.77	44	.0052	12" PVC	3.0	3.9
2A	2		2.4	4.0	5019.67	5019.62	7.1	.007	18"	8.8	4.9
1A	1		2.1	2.1	5010.78	5010.7	26.1	.0031	18"	5.8	3.0
1C	1B		1.6	1.6	5018.00	5013.9	43	.0953	12" PVC	13.0	11.2
1B	1		2.28	3.88	5013.8	5013.25	74.7	.0074	18"	9.0	5.1
6	5		6.3	6.3	5020.4	5020.00	79	.005	18"	7.4	4.7
14	EX.21		3.65	3.65	4994.84	4994.24	40	.015	12" PVC	5.2	7.1
12	11		4.6	4.6	5022.0	5021.5	16.1	.0311	12" PVC	7.4	10.0
11	10		1.8	6.4	5017.03	5014.95	49.1	.0424	18"	21.6	10.7
(FROM 10A)			2.4	8.8	—	—	—	—	—	—	—
10	9		—	8.8	5014.85	5011.31	117.7	.0301	18"	18.2	10.2
(FROM 9A)			10.2	19.0	—	—	—	—	—	—	—
9	8		—	19.0	5011.21	5010.37	18.6	.0452	18"	22.3	14.2
8	7		1.3	20.3	5010.27	5010.00	30	.009	24"	21.5	7.8
10A	10		2.4	2.4	5020.50	5019.50	24.4	.041	18"	21.3	8.0
9A	9		10.2	10.2	5014.41	5011.31	62	.05	18"	23.5	12.8
13	13A		7.8	7.8	5008.00	5005.10	47'	.0617	12" PVC	10.5	14.5
13A	EX.22		7.8	7.8	5005.00	5003.72	50'	.0256	14"x23"	16.8	9.0

* ALL PIPE RCP UNLESS OTHERWISE NOTED.

n = 0.011 (PVC)

n = 0.013 (RCP)

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	2.000 cfs
Slope	0.0317 ft/ft
Manning's n	0.0110

Computed Results:

Depth	4.23 in
Area	0.79 ft2
Wetted Area	0.25 ft2
Wetted Perimeter	15.26 in
Perimeter	37.70 in
Velocity	8.08 fps
Hydraulic Radius	2.34 in
Percent Full	35.27 %
Full flow Flowrate	7.497 cfs
Full flow velocity	9.55 fps

Critical Information

Critical depth	7.24 in
Critical slope	0.0049 ft/ft
Critical velocity	4.04 fps
Critical area	0.50 ft2
Critical perimeter	21.35 in
Critical hydraulic radius	3.34 in
Critical top width	11.74 in
Specific energy	1.37 ft
Minimum energy	0.91 ft
Froude number	2.80
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	2.880 cfs
Slope	0.0386 ft/ft
Manning's n	0.0130

Computed Results:

Depth	4.54 in
Area	1.77 ft2
Wetted Area	0.35 ft2
Wetted Perimeter	18.95 in
Perimeter	56.55 in
Velocity	8.23 fps
Hydraulic Radius	2.66 in
Percent Full	25.24 %
Full flow Flowrate	20.638 cfs
Full flow velocity	11.68 fps

Critical Information

Critical depth	7.74 in
Critical slope	0.0051 ft/ft
Critical velocity	3.97 fps
Critical area	0.73 ft2
Critical perimeter	25.74 in
Critical hydraulic radius	4.06 in
Critical top width	17.82 in
Specific energy	1.43 ft
Minimum energy	0.97 ft
Froude number	2.80
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	6.880 cfs
Slope	0.0220 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.37 in
Area	1.77 ft2
Wetted Area	0.81 ft2
Wetted Perimeter	27.02 in
Perimeter	56.55 in
Velocity	8.54 fps
Hydraulic Radius	4.29 in
Percent Full	46.52 %
Full flow Flowrate	15.580 cfs
Full flow velocity	8.82 fps

Critical Information

Critical depth	12.18 in
Critical slope	0.0067 ft/ft
Critical velocity	5.40 fps
Critical area	1.27 ft2
Critical perimeter	34.79 in
Critical hydraulic radius	5.27 in
Critical top width	16.84 in
Specific energy	1.83 ft
Minimum energy	1.52 ft
Froude number	2.05
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	12.860 cfs
Slope	0.1127 ft/ft
Manning's n	0.0130

Computed Results:

Depth	7.52 in
Area	1.77 ft2
Wetted Area	0.70 ft2
Wetted Perimeter	25.30 in
Perimeter	56.55 in
Velocity	18.39 fps
Hydraulic Radius	3.98 in
Percent Full	41.78 %
Full flow Flowrate	35.264 cfs
Full flow velocity	19.96 fps

Critical Information

Critical depth	16.16 in
Critical slope	0.0132 ft/ft
Critical velocity	7.69 fps
Critical area	1.67 ft2
Critical perimeter	44.83 in
Critical hydraulic radius	5.37 in
Critical top width	10.91 in
Specific energy	5.88 ft
Minimum energy	2.02 ft
Froude number	4.72
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	1.600 cfs
Slope	0.0052 ft/ft
Manning's n	0.0110

Computed Results:

Depth	6.19 in
Area	0.79 ft2
Wetted Area	0.41 ft2
Wetted Perimeter	19.23 in
Perimeter	37.70 in
Velocity	3.92 fps
Hydraulic Radius	3.06 in
Percent Full	51.58 %
Full flow Flowrate	3.036 cfs
Full flow velocity	3.87 fps

Critical Information

Critical depth	6.44 in
Critical slope	0.0045 ft/ft
Critical velocity	3.72 fps
Critical area	0.43 ft2
Critical perimeter	19.74 in
Critical hydraulic radius	3.13 in
Critical top width	11.97 in
Specific energy	0.75 ft
Minimum energy	0.81 ft
Froude number	1.08
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	4.000 cfs
Slope	0.0070 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.52 in
Area	1.77 ft2
Wetted Area	0.82 ft2
Wetted Perimeter	27.31 in
Perimeter	56.55 in
Velocity	4.86 fps
Hydraulic Radius	4.34 in
Percent Full	47.34 %
Full flow Flowrate	8.789 cfs
Full flow velocity	4.97 fps

Critical Information

Critical depth	9.19 in
Critical slope	0.0054 ft/ft
Critical velocity	4.41 fps
Critical area	0.91 ft2
Critical perimeter	28.65 in
Critical hydraulic radius	4.56 in
Critical top width	18.00 in
Specific energy	1.08 ft
Minimum energy	1.15 ft
Froude number	1.15
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	2.100 cfs
Slope	0.0031 ft/ft
Manning's n	0.0130

Computed Results:

Depth	7.46 in
Area	1.77 ft2
Wetted Area	0.69 ft2
Wetted Perimeter	25.17 in
Perimeter	56.55 in
Velocity	3.04 fps
Hydraulic Radius	3.96 in
Percent Full	41.42 %
Full flow Flowrate	5.849 cfs
Full flow velocity	3.31 fps

Critical Information

Critical depth	6.56 in
Critical slope	0.0050 ft/ft
Critical velocity	3.60 fps
Critical area	0.58 ft2
Critical perimeter	23.34 in
Critical hydraulic radius	3.60 in
Critical top width	17.33 in
Specific energy	0.76 ft
Minimum energy	0.82 ft
Froude number	0.78
Flow condition	Subcritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	1.600 cfs
Slope	0.0953 ft/ft
Manning's n	0.0110

Computed Results:

Depth	2.84 in
Area	0.79 ft2
Wetted Area	0.14 ft2
Wetted Perimeter	12.20 in
Perimeter	37.70 in
Velocity	11.24 fps
Hydraulic Radius	1.68 in
Percent Full	23.69 %
Full flow Flowrate	12.998 cfs
Full flow velocity	16.55 fps

Critical Information

Critical depth	6.44 in
Critical slope	0.0045 ft/ft
Critical velocity	3.72 fps
Critical area	0.43 ft2
Critical perimeter	19.74 in
Critical hydraulic radius	3.13 in
Critical top width	11.97 in
Specific energy	2.20 ft
Minimum energy	0.81 ft
Froude number	4.85
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	3.880 cfs
Slope	0.0074 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.24 in
Area	1.77 ft2
Wetted Area	0.79 ft2
Wetted Perimeter	26.75 in
Perimeter	56.55 in
Velocity	4.92 fps
Hydraulic Radius	4.25 in
Percent Full	45.78 %
Full flow Flowrate	9.036 cfs
Full flow velocity	5.11 fps

Critical Information

Critical depth	9.04 in
Critical slope	0.0054 ft/ft
Critical velocity	4.37 fps
Critical area	0.89 ft2
Critical perimeter	28.36 in
Critical hydraulic radius	4.51 in
Critical top width	18.00 in
Specific energy	1.06 ft
Minimum energy	1.13 ft
Froude number	1.19
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	6.300 cfs
Slope	0.0050 ft/ft
Manning's n	0.0130

Computed Results:

Depth	12.73 in
Area	1.77 ft2
Wetted Area	1.34 ft2
Wetted Perimeter	35.96 in
Perimeter	56.55 in
Velocity	4.72 fps
Hydraulic Radius	5.35 in
Percent Full	70.70 %
Full flow Flowrate	7.428 cfs
Full flow velocity	4.20 fps

Critical Information

Critical depth	11.64 in
Critical slope	0.0064 ft/ft
Critical velocity	5.21 fps
Critical area	1.21 ft2
Critical perimeter	33.64 in
Critical hydraulic radius	5.18 in
Critical top width	17.21 in
Specific energy	1.41 ft
Minimum energy	1.46 ft
Froude number	0.84
Flow condition	Subcritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	3.650 cfs
Slope	0.0150 ft/ft
Manning's n	0.0110

Computed Results:

Depth	7.45 in
Area	0.79 ft2
Wetted Area	0.51 ft2
Wetted Perimeter	21.78 in
Perimeter	37.70 in
Velocity	7.12 fps
Hydraulic Radius	3.39 in
Percent Full	62.11 %
Full flow Flowrate	5.157 cfs
Full flow velocity	6.57 fps

Critical Information

Critical depth	9.78 in
Critical slope	0.0076 ft/ft
Critical velocity	5.33 fps
Critical area	0.69 ft2
Critical perimeter	27.02 in
Critical hydraulic radius	3.65 in
Critical top width	9.32 in
Specific energy	1.41 ft
Minimum energy	1.22 ft
Froude number	1.73
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	4.600 cfs
Slope	0.0311 ft/ft
Manning's n	0.0110

Computed Results:

Depth	6.83 in
Area	0.79 ft2
Wetted Area	0.46 ft2
Wetted Perimeter	20.52 in
Perimeter	37.70 in
Velocity	9.96 fps
Hydraulic Radius	3.24 in
Percent Full	56.96 %
Full flow Flowrate	7.425 cfs
Full flow velocity	9.45 fps

Critical Information

Critical depth	10.72 in
Critical slope	0.0106 ft/ft
Critical velocity	6.21 fps
Critical area	0.74 ft2
Critical perimeter	29.71 in
Critical hydraulic radius	3.59 in
Critical top width	7.41 in
Specific energy	2.11 ft
Minimum energy	1.34 ft
Froude number	2.57
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	6.400 cfs
Slope	0.0424 ft/ft
Manning's n	0.0130

Computed Results:

Depth	6.71 in
Area	1.77 ft2
Wetted Area	0.60 ft2
Wetted Perimeter	23.64 in
Perimeter	56.55 in
Velocity	10.66 fps
Hydraulic Radius	3.66 in
Percent Full	37.28 %
Full flow Flowrate	21.630 cfs
Full flow velocity	12.24 fps

Critical Information

Critical depth	11.74 in
Critical slope	0.0064 ft/ft
Critical velocity	5.24 fps
Critical area	1.22 ft2
Critical perimeter	33.84 in
Critical hydraulic radius	5.19 in
Critical top width	17.15 in
Specific energy	2.32 ft
Minimum energy	1.47 ft
Froude number	2.92
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	8.800 cfs
Slope	0.0301 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.82 in
Area	1.77 ft2
Wetted Area	0.86 ft2
Wetted Perimeter	27.91 in
Perimeter	56.55 in
Velocity	10.22 fps
Hydraulic Radius	4.44 in
Percent Full	48.99 %
Full flow Flowrate	18.224 cfs
Full flow velocity	10.31 fps

Critical Information

Critical depth	13.78 in
Critical slope	0.0081 ft/ft
Critical velocity	6.06 fps
Critical area	1.45 ft2
Critical perimeter	38.35 in
Critical hydraulic radius	5.45 in
Critical top width	15.25 in
Specific energy	2.36 ft
Minimum energy	1.72 ft
Froude number	2.38
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	19.000 cfs
Slope	0.0452 ft/ft
Manning's n	0.0130

Computed Results:

Depth	12.76 in
Area	1.77 ft2
Wetted Area	1.34 ft2
Wetted Perimeter	36.03 in
Perimeter	56.55 in
Velocity	14.19 fps
Hydraulic Radius	5.35 in
Percent Full	70.87 %
Full flow Flowrate	22.333 cfs
Full flow velocity	12.64 fps

Critical Information

Critical depth	17.52 in
Critical slope	0.0290 ft/ft
Critical velocity	10.83 fps
Critical area	1.75 ft2
Critical perimeter	50.67 in
Critical hydraulic radius	4.99 in
Critical top width	5.77 in
Specific energy	4.19 ft
Minimum energy	2.19 ft
Froude number	2.52
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	24.00 in
Flowrate	20.300 cfs
Slope	0.0090 ft/ft
Manning's n	0.0130

Computed Results:

Depth	18.60 in
Area	3.14 ft2
Wetted Area	2.61 ft2
Wetted Perimeter	51.67 in
Perimeter	75.40 in
Velocity	7.77 fps
Hydraulic Radius	7.28 in
Percent Full	77.49 %
Full flow Flowrate	21.461 cfs
Full flow velocity	6.83 fps

Critical Information

Critical depth	19.41 in
Critical slope	0.0083 ft/ft
Critical velocity	7.46 fps
Critical area	2.72 ft2
Critical perimeter	53.66 in
Critical hydraulic radius	7.30 in
Critical top width	18.88 in
Specific energy	2.49 ft
Minimum energy	2.43 ft
Froude number	1.10
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:	
Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	2.400 cfs
Slope	0.0410 ft/ft
Manning's n	0.0130

Computed Results:	
Depth	4.08 in
Area	1.77 ft2
Wetted Area	0.30 ft2
Wetted Perimeter	17.87 in
Perimeter	56.55 in
Velocity	7.97 fps
Hydraulic Radius	2.43 in
Percent Full	22.68 %
Full flow Flowrate	21.270 cfs
Full flow velocity	12.04 fps

Critical Information

Critical depth	7.04 in
Critical slope	0.0050 ft/ft
Critical velocity	3.75 fps
Critical area	0.64 ft2
Critical perimeter	24.31 in
Critical hydraulic radius	3.79 in
Critical top width	17.57 in
Specific energy	1.33 ft
Minimum energy	0.88 ft
Froude number	2.87
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	10.200 cfs
Slope	0.0500 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.29 in
Area	1.77 ft2
Wetted Area	0.80 ft2
Wetted Perimeter	26.86 in
Perimeter	56.55 in
Velocity	12.82 fps
Hydraulic Radius	4.26 in
Percent Full	46.08 %
Full flow Flowrate	23.488 cfs
Full flow velocity	13.29 fps

Critical Information

Critical depth	14.76 in
Critical slope	0.0094 ft/ft
Critical velocity	6.58 fps
Critical area	1.55 ft2
Critical perimeter	40.77 in
Critical hydraulic radius	5.48 in
Critical top width	13.84 in
Specific energy	3.25 ft
Minimum energy	1.84 ft
Froude number	3.10
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	7.800 cfs
Slope	0.1016 ft/ft
Manning's n	0.0130

Computed Results:

Depth	5.91 in
Area	1.77 ft2
Wetted Area	0.51 ft2
Wetted Perimeter	21.97 in
Perimeter	56.55 in
Velocity	15.44 fps
Hydraulic Radius	3.31 in
Percent Full	32.84 %
Full flow Flowrate	33.482 cfs
Full flow velocity	18.95 fps

Critical Information

Critical depth	12.99 in
Critical slope	0.0073 ft/ft
Critical velocity	5.71 fps
Critical area	1.36 ft2
Critical perimeter	36.53 in
Critical hydraulic radius	5.38 in
Critical top width	16.14 in
Specific energy	4.20 ft
Minimum energy	1.62 ft
Froude number	4.55
Flow condition	Supercritical

Channel D-2

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	7.8300 cfs
Slope	0.0514 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	48.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Basin D-2
0.35 ac

Computed Results:

Depth	4.3805 in
Velocity	5.2040 fps
Flow area	1.5046 ft2
Flow perimeter	57.2350 in
Hydraulic radius	3.7855 in
Top width	50.9204 in
Area	4.3333 ft2
Perimeter	73.2982 in
Percent full	36.5046 %

Critical Information

Critical depth	5.8236 in
Critical slope	0.0206 ft/ft
Critical velocity	3.8768 fps
Critical area	2.0197 ft2
Critical perimeter	60.2772 in
Critical hydraulic radius	4.8250 in
Critical top width	51.8824 in
Specific energy	0.7859 ft
Minimum energy	0.7279 ft
Froude number	1.5407
Flow condition	Supercritical

Channel E-1

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.8600 cfs
Slope	0.0670 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Basin E-1
1.45 cfs

Computed Results:

Depth	3.4770 in
Velocity	3.4146 fps
Flow area	0.2519 ft2
Flow perimeter	21.9902 in
Hydraulic radius	1.6493 in
Top width	20.8617 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	28.9746 %

Critical Information

Critical depth	4.1767 in
Critical slope	0.0252 ft/ft
Critical velocity	2.3663 fps
Critical area	0.3634 ft2
Critical perimeter	26.4160 in
Critical hydraulic radius	1.9812 in
Critical top width	25.0604 in
Specific energy	0.4709 ft
Minimum energy	0.5221 ft
Froude number	1.5816
Flow condition	Supercritical

Channel F-1

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	1.3300 cfs
Slope	0.0670 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	4.0946 in
Velocity	3.8078 fps
Flow area	0.3493 ft2
Flow perimeter	25.8962 in
Hydraulic radius	1.9422 in
Top width	24.5673 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	34.1213 %

Critical Information

Critical depth	4.9725 in
Critical slope	0.0238 ft/ft
Critical velocity	2.5819 fps
Critical area	0.5151 ft2
Critical perimeter	31.4491 in
Critical hydraulic radius	2.3587 in
Critical top width	29.8352 in
Specific energy	0.5665 ft
Minimum energy	0.6216 ft
Froude number	1.6253
Flow condition	Supercritical

Channel F-2

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.3300 cfs
Slope	0.0800 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	2.3484 in
Velocity	2.8723 fps
Flow area	0.1149 ft2
Flow perimeter	14.8523 in
Hydraulic radius	1.1139 in
Top width	14.0902 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	19.5697 %

Critical Information

Critical depth	2.8474 in
Critical slope	0.0286 ft/ft
Critical velocity	1.9537 fps
Critical area	0.1689 ft2
Critical perimeter	18.0083 in
Critical hydraulic radius	1.3506 in
Critical top width	17.0842 in
Specific energy	0.3239 ft
Minimum energy	0.3559 ft
Froude number	1.6188
Flow condition	Supercritical

Channel H-1-A

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	1.7300 cfs
Slope	0.0570 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	4.6579 in
Velocity	3.8274 fps
Flow area	0.4520 ft2
Flow perimeter	29.4593 in
Hydraulic radius	2.2094 in
Top width	27.9475 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	38.8160 %

Critical Information

Critical depth	5.5240 in
Critical slope	0.0230 ft/ft
Critical velocity	2.7213 fps
Critical area	0.6357 ft2
Critical perimeter	34.9370 in
Critical hydraulic radius	2.6203 in
Critical top width	33.1442 in
Specific energy	0.6158 ft
Minimum energy	0.6905 ft
Froude number	1.5317
Flow condition	Supercritical

Channel H-1-B

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.6800 cfs
Slope	0.1000 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	2.9535 in
Velocity	3.7417 fps
Flow area	0.1817 ft2
Flow perimeter	18.6798 in
Hydraulic radius	1.4010 in
Top width	17.7212 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	24.6128 %

Critical Information

Critical depth	3.8023 in
Critical slope	0.0260 ft/ft
Critical velocity	2.2577 fps
Critical area	0.3012 ft2
Critical perimeter	24.0476 in
Critical hydraulic radius	1.8036 in
Critical top width	22.8135 in
Specific energy	0.4637 ft
Minimum energy	0.4753 ft
Froude number	1.8804
Flow condition	Supercritical

Channel I-3-A

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.5700 cfs
Slope	0.0570 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	3.0717 in
Velocity	2.8997 fps
Flow area	0.1966 ft2
Flow perimeter	19.4271 in
Hydraulic radius	1.4570 in
Top width	18.4302 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	25.5974 %

Critical Information

Critical depth	3.5431 in
Critical slope	0.0266 ft/ft
Critical velocity	2.1794 fps
Critical area	0.2615 ft2
Critical perimeter	22.4088 in
Critical hydraulic radius	1.6807 in
Critical top width	21.2588 in
Specific energy	0.3866 ft
Minimum energy	0.4429 ft
Froude number	1.4290
Flow condition	Supercritical

Channel I-3-B

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.2800 cfs
Slope	0.0700 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	2.2640 in
Velocity	2.6220 fps
Flow area	0.1068 ft2
Flow perimeter	14.3189 in
Hydraulic radius	1.0739 in
Top width	13.5841 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	18.8668 %

Critical Information

Critical depth	2.6663 in
Critical slope	0.0293 ft/ft
Critical velocity	1.8906 fps
Critical area	0.1481 ft2
Critical perimeter	16.8628 in
Critical hydraulic radius	1.2647 in
Critical top width	15.9975 in
Specific energy	0.2955 ft
Minimum energy	0.3333 ft
Froude number	1.5051
Flow condition	Supercritical

Channel I-4

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.1600 cfs
Slope	0.0670 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	1.8506 in
Velocity	2.2426 fps
Flow area	0.0713 ft2
Flow perimeter	11.7041 in
Hydraulic radius	0.8778 in
Top width	11.1035 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	15.4215 %

Critical Information

Critical depth	2.1315 in
Critical slope	0.0315 ft/ft
Critical velocity	1.6904 fps
Critical area	0.0947 ft2
Critical perimeter	13.4808 in
Critical hydraulic radius	1.0111 in
Critical top width	12.7890 in
Specific energy	0.2324 ft
Minimum energy	0.2664 ft
Froude number	1.4238
Flow condition	Supercritical

Weir Calculator

Given Input Data:

Weir Type	Rectangular
Equation	Suppressed
Solving for	Depth of Flow
Flowrate	7.8300 cfs
Coefficient	2.6400
Height	6.0000 in

Computed Results:

Depth of Flow	3.2146 in
Full Flow	19.9662 cfs
Velocity	7.3073 fps
Width	48.0000 in
Area	2.0000 ft2
Perimeter	60.0000 in
Wet Perimeter	54.4292 in
Wet Area	1.0715 ft2
Percent Full	53.5769 %

EXHIBIT 1

HISTORIC DRAINAGE

EXHIBIT 2

GRADING/DRAINAGE PLAN

EXHIBIT 3

GRADING PLAN

EXHIBIT 4

STORM DRAINAGE PLAN & PROFILE

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