CITY OF
Albuquerque

June 7, 1996

Martin J. Chávez, Mayor

Larry Read
Larry Read & Assoc.
P.O. Box 90233
Albuquerque, NM 87199

RE: MOBILE SCREEN & GLASS (J20-D24). DRAINAGE REPORT FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED 4-22-96.

Dear Mr. Read:

Based on the information provided on your May 15, 1996 submittal, the above referenced project is approved for Building Permit.

If your client has not started construction of the building addition by June 7, 1997, a new submittal for Building Permit approval will be required.

Prior to Certificate of Occupancy, an Engineer's Certification will be required.

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

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: MOBILE SCREEN & GLASS ZONE ATLAS/DRNG. FILE: J-20-Z D24

LEGAL DESCRIPTION: TRACT A-1-A, BLOCK 20, BELLHAVEN ADDITION

CITY ADDRESS: 8650 Indian School Road NE

ENGINEERING FIRM: LARRY READ & ASSOCIATES CONTACT: LARRY READ

ADDRESS: P. O. BOX 90233 ALB, NM 87199 PHONE: 858-3165

OWNER: Mobile Screen & Glass CONTACT: Jay Frinkman

ADDRESS: 8650 Indian School Road NE PHONE: 294-0542

ARCHITECT: CONTACT:

ADDRESS: PHONE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

PREDESIGN MEETING:

_____ YES
__X__ NO

_____ COPY OF CONFERENCE RECAP SHEET

PROVIDED

TYPE OF TRANSMITTAL:

__X__ DRAINAGE REPORT

_____ DRAINAGE PLAN

_____ PRELIMINARY GRADING AND DRAINAGE

__X__ GRADING PLAN

_____ EROSION CONTROL PLAN

_____ ENGINEER'S CERTIFICATION

DATE SUBMITTED: April 21, 1996

BY: LARRY READ

MAY 15 1996

DRB NO. _____
EPC NO. _____

PROJECT NO. _____

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL

_____ PRELIMINARY PLAT APPROVAL

_____ SITE DEVELOPMENT PLAN APPROVAL

_____ FINAL PLAT APPROVAL

__X__ BUILDING PERMIT APPROVAL

_____ FOUNDATION PERMIT APPROVAL

_____ CERTIFICATE OF OCCUPANCY APPROVAL

_____ ROUGH GRADING PERMIT APPROVAL

_____ GRADING/PAVING PERMIT APPROVAL

_____ OTHER _____ (SPECIFY)

LARRY READ & ASSOCIATES

Civil Engineers
Drainage • Site • Utility Design

DRAINAGE REPORT

for

MOBILE SCREEN and GLASS

8650 Indian School Road N.E.

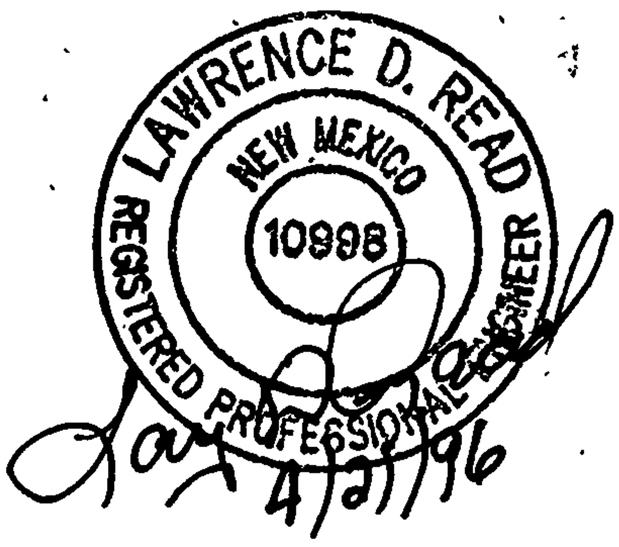
in

Albuquerque, New Mexico

April 21, 1996

Prepared by

Larry D. Read, PE



P.O. Box 90233 • Albuquerque, New Mexico 87199-0233 • (505) 858-3165

DRAINAGE REPORT

for

MOBILE SCREEN and GLASS

Tract A-1-A, BLOCK 20

BELLHAVEN ADDITION

ALBUQUERQUE, NEW MEXICO

April 21, 1996

LOCATION & DESCRIPTION

The proposed site is a 0.7851 acre tract located on the south side of Indian School Road NE just west of Wyoming Boulevard N.E. within the City of Albuquerque, New Mexico.

The site is currently developed with a 6,700 sf building and 8,250 sf of paved parking. In addition, an unpaved vehicle storage area has recently been enclosed with a 10' high CMU wall. This storage area, at the south side of the property, encloses 6,750 sf of secure parking for the company's service vehicles.

HISTORICAL DRAINAGE

The existing development discharges all runoff to a 20' wide public alley that runs from the southeast corner of the project site to Wyoming Boulevard. The alley west of this site is unpaved but stabilized with grass and has been graded as a triangular channel to convey the flows. Several of the properties that border the alley have built walls on the north side that provide additional capacity as well as privacy. The entire south side of the alley is walled with cmu fences. This property slopes about 2% toward the southwest which allows some runoff to cross the property to the west to get to the alley. This cross lot drainage will be eliminated by the proposed grading plan.

The walled parking area at the south side of this property discharges runoff to the alley through 12 openings in the wall created by turning 6 cmu blocks sideways in the south corner

of the wall near the west side. This same opening arrangement has been provided in the northwest corner of the wall to accommodate runoff from the existing and proposed parking lots.

In addition to the runoff created on-site, a 12' wide channel conveys runoff from part of the Bellhaven Subdivision east of this site to the alley east of this site. This 20' wide paved alley turns at the southeast corner of this lot to join the alley discussed above at the south side of the site. The runoff follows this path until it discharges to Wyoming.

Runoff conveyed west within Indian School Road is isolated from entering the site by waterblocks along the north property line of this site. The area that currently provides the waterblocks is not proposed for any changes or grading by this Grading and Drainage Plan.

No part of this site is within a designated 100 year flood plain shown on FEMA Panel 350002-0030 effective October 14, 1983. An exert from Floodway Panel 350002-0030 is included in the appendix of this report that shows the flood plains in the area as well as the portion of the Bellhaven Subdivision that discharges to the alley at the east side of this site.

PROPOSED CONDITIONS

Mobile Screen and Glass, the owner and developer of this site, proposes to improve this site in two construction phases. The first phase will pave the enclosed vehicle parking area at the south side of the site and the parking lot at the west side of the building. This will include 15,600 sf of pavement.

BP is good for 14th only

The second phase of the construction has not been scheduled at this time but will include the 2,500 sf building at the northeast corner of the existing building. There will not be any additional paving constructed during this phase.

The proposed grading divides the site into three drainage basins as shown on the Grading and Drainage Plan in the pocket at the rear of this report. Basin A is the east half of the existing building, the paved alley east of the building and the portion of the alley adjacent to the south property line. This basin includes 11,562 sf that is currently 100% Type 'D' land treatment as pavement and building roof. Basin 'B' includes the entire area within the cmu wall storage area at the south side of the site as well as the west portion of the roof that drains into the storage area. This basin includes 7,279 sf that is currently Type 'C' land treatment except the small portion of the roof. Basin 'C' is the balance of the site which includes the west portion of the roof that was not addressed above, the existing paved north parking lot, the proposed west parking lot and the proposed building. This basin includes 23,933 sf that is 51% Type 'D' land treatment as pavement and building roof, 2.4% Type 'B' land treatment site in two separate landscape planters, and the balance Type 'C' land treatment that is currently unpaved parking along the west side of the building.

It is proposed that most of the existing drainage patterns will remain unchanged by the new construction. The two alleys east and south of the site will not be altered from the existing condition. The cmu walled storage area at the south side of the site will drain through openings in the cmu wall as they currently do. The proposed parking and building on the west side of the site will drain through the openings in north side of the cmu wall, through a swaled area in the pavement within the storage area, and out the openings in the south wall into the alley.

The runoff that currently crosses the parcel west of this one will by contained on-site by a proposed 2' wide raised planter along the west property line and directed into the openings in the north cmu wall.

OFFSITE DRAINAGE

As discussed above, a 7.23 acre portion of the Bellhaven Subdivision discharges runoff through the concrete channel to the alley at the east side of this site. This portion of the subdivision is developed to a density of about 3.5 dwellings per acre. Using Table A-5 of Chapter 22.2 of the DPM, this equates to 38% Type 'D' land treatment. The balance of the area has been equally divided between Types 'B' and 'C' to represent the areas of turf and southwest type landscaping existing within the subdivision.

This off-site area has been designated Drainage Basin 'D' and is shown in the Appendix of this report. Using Ahymo, the runoff from this basin has been estimated and routed through the channel and alleys to determine if the alley south of Mobile Screen and Glass has sufficient capacity to convey runoff from the proposed development.

The results of this routing are included in the Appendix of this report.

PEAK RUNOFF QUANTITIES

The AHYMO printouts, summary sheets, and miscellaneous calculations to support these analyses are included in the Appendix of this report for reference. The values by Drainage Basin are summarized as follows:

Basin A	Total Area	= 0.000415 sq mi
	Developed Peak Runoff Q_{100}	=1.34 cfs
	Developed Volume V_{100}	=0.052 ac-ft
	Developed Peak Runoff Q_{10}	=0.89 cfs
	Developed Volume V_{10}	=0.035 ac-ft

Basin B	Total Area	= 0.000261 sq mi
	Developed Peak Runoff Q_{100}	=0.85 cfs
	Developed Volume V_{100}	=0.033 ac-ft
	Developed Peak Runoff Q_{10}	=0.57 cfs
	Developed Volume V_{10}	=0.022 ac-ft
Basin C	Total Area	= 0.000858 sq mi
	Developed Peak Runoff Q_{100}	=2.74 cfs
	Developed Volume V_{100}	=0.106 ac-ft
	Developed Peak Runoff Q_{10}	=1.83 cfs
	Developed Volume V_{10}	=0.071 ac-ft
Basin D	Total Area	= 0.012592 sq m
	Developed Peak Runoff Q_{100}	=22.90 cfs
	Developed Volume V_{100}	=1.055 ac-ft
	Developed Peak Runoff Q_{10}	=15.27 cfs
	Developed Volume V_{10}	=0.704 ac-ft

METHODOLOGY

The hydrology for this project was analyzed using the January 1994 release of the AHYMO computer modeling program as developed by AMAFCA. All procedures are in accordance with those shown in the January 1993 release of the City of Albuquerque Development Process Manual, Section 22.2.

The specific values used for this analysis are as follows:

-Precipitation Zone 3

-Design Storm 100-year, 6-hour duration
i = 2.60 inches (t_c = 0.2 hours)

APPENDIX A

LARRY READ & ASSOCIATES
Civil Engineers
Site Drainage Utility Design

LETTER OF TRANSMITTAL

DATE: June 6, 1996

TO: Lisa Manwill
PWD Hydrology

ATENTION: LISA MANWILL

TRANSMIT VIA: FAX

Lisa,
This is the historic info you requested. The total increase in the alley due to development is 0.33cfs.
Thanks for your help.
Larry

DESCRIPTION OF ITEMS INCLUDED:
Mobile Screen & Glass - AHYMO Run of Historic Runoff

ACTION REQUESTED As You Requested

93767
90175
950

REMARKS: Lisa, The only basins that changed were B & C.

"B" Q_{100} = 0.59 cfs Historic
Q_{100} = 0.85 cfs Developed

"C" Q_{100} = 2.93 cfs Historic
Q_{100} = 2.74 cfs Developed

Total Discharge to Alley
Q_{100} = 26.00 cfs
Q_{100} = 26.33 cfs

P. O. Box 90233 Albuquerque, New Mexico 87199-0233 (505) 858-3165

```
START                   TIME=0.0   PUNCH CODE=0   PRINT LINES=-6
*
*
*S  COMPUTE 100 YR. 6 HR. HYDROGRAPHS.
*S
*S
*
*S  ------------------------------------
*S  ---      HISTORIC   CONDITIONS    ---
*S  --       USING -  6 HOUR STORM     --
*S  ---   PER COA DPM SECTION 22.2     ---
*S  ---RAINFALL IS ZONE 3 (FIG. A-1)---
*S  ------------------------------------
*
*S  FILE NAME HISTORIC.DAT
*S
*
*
RAINFALL                TYPE=-1  RAIN QUARTER=0.0  RAIN ONE=2.14
                        RAIN SIX=2.60  RAIN DAY=3.10  DT=.033333
*S
*S BASIN A
*S
*
COMPUTE NM HYD          ID=1 HYD NO=101.1 DA=.000415  PER A=0
                        PER B=0 PER C=0 PER D=100 TP=-0.133  RAIN=-1
PRINT HYD               ID=1 CODE=10
*S
*S BASIN B
*S
*
COMPUTE NM HYD          ID=2 HYD NO=102.1 DA=.000261  PER A=0
                        PER B=0 PER C=100 PER D=0 TP=-0.133  RAIN=-1
PRINT HYD               ID=2 CODE=10
*S
*S BASIN C
*S
*
COMPUTE NM HYD          ID=3 HYD NO=103.1 DA=.000858  PER A=0
                        PER B=2.4 PER C=37.1 PER D=60.5 TP=-0.133  RAIN=-1
PRINT HYD               ID=3 CODE=10
*S
*S BASIN D
*S
*
COMPUTE NM HYD          ID=4 HYD NO=104.1 DA=.012592  PER A=0
                        PER B=31 PER C=31 PER D=38 TP=-0.218  RAIN=-1
PRINT HYD               ID=4 CODE=10
*S
*S
*S  DUE TO SHORT DISTANCES, ON-SITE BASINS 'B' AMD 'C' ARE ADDED DIRECTLY
*S  TO DETERMINE TOTAL RUNOFF FROM TO THE SOUTH ALLEY
*S
*S
ADD HYD                 ID=10 HYD NO=110.0 ID I=2 ID II=3
PRINT HYD               ID=10 CODE=10
*S
*S  DISCHARGE FROM BASIN D IS COMPUTED AT END OF CONCRETE CHANNEL ON THE
*S  ON THE EAST SIDE OF THE SITE.  SEE HAND CALCULATIONS FOR CHANNEL CAPACITY
*S  CHECK.  THIS RUNOFF IS THEN ROUTED THROUGH THE ALLEYS AND ADDED TO
```

```
*S  BASIN 'A' RUNOFF.  THIS TOTAL IS COMBINED WITH ON-SITE RUNOFF TO DETERMINE
*S  CAPACITY IN ALLEY SOUTH OF THIS SITE TO WYOMING
*S
*S
COMPUTE RATING CURVE  CID=1 VS NO=3 SEGS=1
                      MIN ELEV=0.10  MAX ELEV=1.00
                      CH SLP=0.0091 FP SLP=0.0091 N=-0.013 DIST =20
                      DIST  ELEV   DIST  ELEV  DIST  ELEV
                      0.0   1.00   10.0  0.10  20.0  1.00
COMPUTE TRAVEL TIME ID=11 REACH NO=1  NO VS =1    L=135 FT
                    SLP = .0091
ROUTE               ID=11 HYD NO 111.0 INFLOW ID=4 DT=0.0
ADD HYD             ID=12 HYD NO=112.0 ID I=11 ID II=1
PRINT HYD           ID=12 CODE=10
*S
*S
ADD HYD             ID=13 HYD NO=112.0 ID I=12 ID II=10
```

```
*S
PRINT HYD              ID=13 CODE=10
FINISH
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/06/1996
INPUT FILE = C:\ACAD12\MOBILS&G\HISTORIC.DAT USER NO.= CINFRNNM.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
										PAGE = 1
										TIME= .00
START										
*S COMPUTE 100 YR. 6 HR. HYDROGRAPHS.										
*S										
*S										
*S --- HISTORIC CONDITIONS ---										
*S -- USING - 6 HOUR STORM --										
*S --- PER COA DPM SECTION 22.2 ---										
*S ---RAINFALL IS ZONE 3 (FIG. A-1)---										
*S										
*S FILE NAME HISTORIC.DAT										
*S										
RAINFALL TYPE= 1										RAIN6= 2.600
*S										
*S BASIN A										
*S										
COMPUTE NM HYD	101.10	-	1	.00042	1.34	.052	2.35524	1.500	5.058	PER IMP= 100.00
*S										
*S BASIN B										
*S										
COMPUTE NM HYD	102.10	-	2	.00026	.59	.018	1.28997	1.500	3.518	PER IMP= .00
*S										
*S BASIN C										
*S										
COMPUTE NM HYD	103.10	-	3	.00086	2.43	.088	1.92430	1.500	4.416	PER IMP= 60.50
*S										
*S BASIN D										
*S										
COMPUTE NM HYD	104.10	-	4	.01259	22.90	1.055	1.57114	1.600	2.841	PER IMP= 38.00
*S										
*S										
*S DUE TO SHORT DISTANCES, ON-SITE BASINS 'B' AND 'C' ARE ADDED DIRECTLY										
*S TO DETERMINE TOTAL RUNOFF FROM TO THE SOUTH ALLEY										
*S										
*S										
ADD HYD	110.00	2& 3	10	.00112	3.01	.106	1.77596	1.500	4.207	
*S										
*S DISCHARGE FROM BASIN D IS COMPUTED AT END OF CONCRETE CHANNEL ON THE										
*S ON THE EAST SIDE OF THE SITE. SEE HAND CALCULATIONS FOR CHANNEL CAPACITY										
*S CHECK. THIS RUNOFF IS THEN ROUTED THROUGH THE ALLEYS AND ADDED TO										
*S BASIN 'A' RUNOFF. THIS TOTAL IS COMBINED WITH ON-SITE RUNOFF TO DETERMINE										
*S CAPACITY IN ALLEY SOUTH OF THIS SITE TO WYOMING										
*S										
*S										
ROUTE	111.00	4	11	.01259	22.93	1.055	1.57114	1.600	2.846	
ADD HYD	112.00	11& 1	12	.01301	23.85	1.107	1.59610	1.600	2.865	
*S										
*S										
ADD HYD	112.00	12&10	13	.01413	26.00	1.213	1.61035	1.600	2.876	
*S										
FINISH										

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 06/06/1996
         START TIME (HR:MIN:SEC) = 14:13:31     USER NO.= CINFRNNM.101
         INPUT FILE = C:\ACAD12\MOBILS&G\HISTORIC.DAT

START                TIME=0.0  PUNCH CODE=0  PRINT LINES=-6
*
*
*S  COMPUTE 100 YR. 6 HR. HYDROGRAPHS.
*S
*S
*
*S  ------------------------------------
*S  ---     HISTORIC   CONDITIONS    ---
*S  --       USING -  6 HOUR STORM     --
*S  ---  PER COA DPM SECTION 22.2    ---
*S  ---RAINFALL IS ZONE 3 (FIG. A-1)---
*S  ------------------------------------
*
*S  FILE NAME HISTORIC.DAT
*S
*
*
RAINFALL             TYPE=-1  RAIN QUARTER=0.0  RAIN ONE=2.14
                     RAIN SIX=2.60  RAIN DAY=3.10  DT=.033333

                COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.60 HR.
                DT =    .033333 HOURS       END TIME =     5.999940 HOURS
*S
*S BASIN A
*S
*
COMPUTE NM HYD       ID=1 HYD NO=101.1 DA=.000415  PER A=0
                     PER B=0 PER C=0 PER D=100 TP=-0.133  RAIN=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.6421    CFS   UNIT VOLUME =    .9924       B =   526.28      P60 = 2.1400
    AREA =      .000415 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333

PRINT HYD            ID=1 CODE=10

                                PARTIAL HYDROGRAPH   101.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000       .0          1.333        .4         2.667        .0         4.000        .0         5.333        .0
     .333       .0          1.667        .7         3.000        .0         4.333        .0         5.667        .0
     .667       .0          2.000        .3         3.333        .0         4.667        .0         6.000        .0
    1.000       .0          2.333        .1         3.667        .0         5.000        .0         6.333        .0

    RUNOFF VOLUME =     2.35524 INCHES     =        .0521 ACRE-FEET
    PEAK DISCHARGE RATE =       1.34 CFS  AT    1.500 HOURS   BASIN AREA =    .0004 SQ. MI.


*S
*S BASIN B
*S
*
COMPUTE NM HYD       ID=2 HYD NO=102.1 DA=.000261  PER A=0
                     PER B=0 PER C=100 PER D=0 TP=-0.133  RAIN=-1

    K =   .108667HR    TP =   .133000HR    K/TP RATIO =   .817047     SHAPE CONSTANT, N =  4.373949
    UNIT PEAK =   .74449    CFS   UNIT VOLUME =    .9827       B =   379.38      P60 = 2.1400
    AREA =      .000261 SQ MI    IA =    .35000 INCHES    INF =    .83000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333

PRINT HYD            ID=2 CODE=10

                                PARTIAL HYDROGRAPH   102.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000       .0          .667         .0        1.333        .1         2.000        .1         2.667        .0
```

```
      .333        .0          1.000        .0          1.667        .3          2.333        .0

    RUNOFF VOLUME =     1.28997 INCHES     =        .0180 ACRE-FEET
    PEAK DISCHARGE RATE =        .59 CFS  AT   1.500 HOURS   BASIN AREA =   .0003 SQ. MI.


*S
*S BASIN C
*S
*
COMPUTE NM HYD      ID=3 HYD NO=103.1 DA=.000858  PER A=0
                    PER B=2.4 PER C=37.1 PER D=60.5 TP=-0.133  RAIN=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.0540    CFS   UNIT VOLUME =    .9943       B =   526.28      P60 = 2.1400
    AREA =      .000519 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333


    K =   .110167HR    TP =   .133000HR    K/TP RATIO =   .828325     SHAPE CONSTANT, N =  4.308127
    UNIT PEAK =   .95612    CFS   UNIT VOLUME =    .9867       B =   375.22      P60 = 2.1400
    AREA =      .000339 SQ MI    IA =    .35911 INCHES    INF =    .85552 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333

PRINT HYD           ID=3 CODE=10

                                PARTIAL HYDROGRAPH   103.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000       .0          1.333        .6          2.667        .0          4.000        .0          5.333        .0
     .333       .0          1.667       1.3          3.000        .0          4.333        .0          5.667        .0
     .667       .0          2.000        .5          3.333        .0          4.667        .0          6.000        .0
    1.000       .0          2.333        .1          3.667        .0          5.000        .0          6.333        .0

    RUNOFF VOLUME =     1.92630 INCHES     =        .0881 ACRE-FEET
    PEAK DISCHARGE RATE =       2.43 CFS  AT   1.500 HOURS   BASIN AREA =   .0009 SQ. MI.


*S
*S BASIN D
*S
*
COMPUTE NM HYD      ID=4 HYD NO=104.1 DA=.012592  PER A=0
                    PER B=31 PER C=31 PER D=38 TP=-0.218  RAIN=-1

    K =   .118810HR    TP =   .218000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   11.551    CFS   UNIT VOLUME =    .9991       B =   526.28      P60 = 2.1400
    AREA =      .004785 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333


    K =   .198349HR    TP =   .218000HR    K/TP RATIO =   .909858     SHAPE CONSTANT, N =  3.892619
    UNIT PEAK =   12.461    CFS   UNIT VOLUME =    .9990       B =   347.95      P60 = 2.1400
    AREA =      .007807 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333

PRINT HYD           ID=4 CODE=10

                                PARTIAL HYDROGRAPH   104.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000       .0          1.667       20.7          3.333        .4          5.000        .1          6.667        .0
     .333       .0          2.000        7.7          3.667        .3          5.333        .1          7.000        .0
     .667       .0          2.333        2.6          4.000        .2          5.667        .1          7.333        .0
    1.000       .0          2.667        1.2          4.333        .2          6.000        .1
    1.333       2.3         3.000         .7          4.667        .1          6.333        .0

    RUNOFF VOLUME =     1.57114 INCHES     =       1.0551 ACRE-FEET
    PEAK DISCHARGE RATE =      22.90 CFS  AT   1.600 HOURS   BASIN AREA =   .0126 SQ. MI.


*S
```

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*S
*S  DUE TO SHORT DISTANCES, ON-SITE BASINS 'B' AND 'C' ARE ADDED DIRECTLY
*S  TO DETERMINE TOTAL RUNOFF FROM TO THE SOUTH ALLEY
*S
*S
ADD HYD              ID=10 HYD NO=110.0 ID I=2 ID II=3
PRINT HYD            ID=10 CODE=10
```

PARTIAL HYDROGRAPH 110.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.333	.7	2.667	.0	4.000	.0	5.333	.0
.333	.0	1.667	1.6	3.000	.0	4.333	.0	5.667	.0
.667	.0	2.000	.6	3.333	.0	4.667	.0	6.000	.0
1.000	.0	2.333	.1	3.667	.0	5.000	.0	6.333	.0

RUNOFF VOLUME = 1.77596 INCHES = .1060 ACRE-FEET
PEAK DISCHARGE RATE = 3.01 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

```
*S
*S  DISCHARGE FROM BASIN D IS COMPUTED AT END OF CONCRETE CHANNEL ON THE
*S  ON THE EAST SIDE OF THE SITE.  SEE HAND CALCULATIONS FOR CHANNEL CAPACITY
*S  CHECK.  THIS RUNOFF IS THEN ROUTED THROUGH THE ALLEYS AND ADDED TO
*S  BASIN 'A' RUNOFF.  THIS TOTAL IS COMBINED WITH ON-SITE RUNOFF TO DETERMINE
*S  CAPACITY IN ALLEY SOUTH OF THIS SITE TO WYOMING
*S
*S
COMPUTE RATING CURVE  CID=1 VS NO=3 SEGS=1
                      MIN ELEV=0.10  MAX ELEV=1.00
                      CH SLP=0.0091 FP SLP=0.0091 N=-0.013 DIST =20
                      DIST  ELEV   DIST  ELEV  DIST  ELEV
                      0.0   1.00   10.0  0.10  20.0  1.00
```

RATING CURVE VALLEY SECTION 3.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.10	.00	.00	.00
.15	.02	.02	1.05
.19	.10	.14	2.11
.24	.22	.42	3.16
.29	.40	.90	4.21
.34	.62	1.63	5.26
.38	.90	2.66	6.32
.43	1.22	4.01	7.37
.48	1.60	5.72	8.42
.53	2.02	7.84	9.47
.57	2.49	10.38	10.53
.62	3.02	13.38	11.58
.67	3.59	16.88	12.63
.72	4.21	20.89	13.68
.76	4.89	25.46	14.74
.81	5.61	30.60	15.79
.86	6.38	36.35	16.84
.91	7.20	42.72	17.89
.95	8.08	49.76	18.95
1.00	9.00	57.47	20.00

```
COMPUTE TRAVEL TIME ID=11 REACH NO=1  NO VS =1    L=135 FT
                    SLP = .0091
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.047	.025	.02	.0418
.095	.100	.14	.0263
.142	.224	.42	.0201
.189	.399	.90	.0166
.237	.623	1.63	.0143
.284	.898	2.66	.0127
.332	1.222	4.01	.0114
.379	1.596	5.72	.0105

.426	2.019	7.84	.0097
.474	2.493	10.38	.0090
.521	3.017	13.38	.0085
.568	3.590	16.88	.0080
.616	4.213	20.89	.0076
.663	4.886	25.46	.0072
.711	5.609	30.60	.0069
.758	6.382	36.35	.0066
.805	7.205	42.72	.0063
.853	8.078	49.76	.0061
.900	9.000	57.47	.0059

```
ROUTE          ID=11 HYD NO 111.0 INFLOW ID=4 DT=0.0
ADD HYD        ID=12 HYD NO=112.0 ID I=11 ID II=1
PRINT HYD      ID=12 CODE=10
```

PARTIAL HYDROGRAPH 112.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.667	21.6	3.333	.4	5.000	.1	6.667	.0
.333	.0	2.000	8.2	3.667	.3	5.333	.1	7.000	.0
.667	.0	2.333	2.7	4.000	.2	5.667	.1	7.333	.0
1.000	.0	2.667	1.3	4.333	.2	6.000	.1		
1.333	2.3	3.000	.7	4.667	.2	6.333	.0		

RUNOFF VOLUME = 1.59610 INCHES = 1.1072 ACRE-FEET
PEAK DISCHARGE RATE = 23.85 CFS AT 1.600 HOURS BASIN AREA = .0130 SQ. MI.

```
*S
*S
ADD HYD        ID=13 HYD NO=112.0 ID I=12 ID II=10
*S
PRINT HYD      ID=13 CODE=10
```

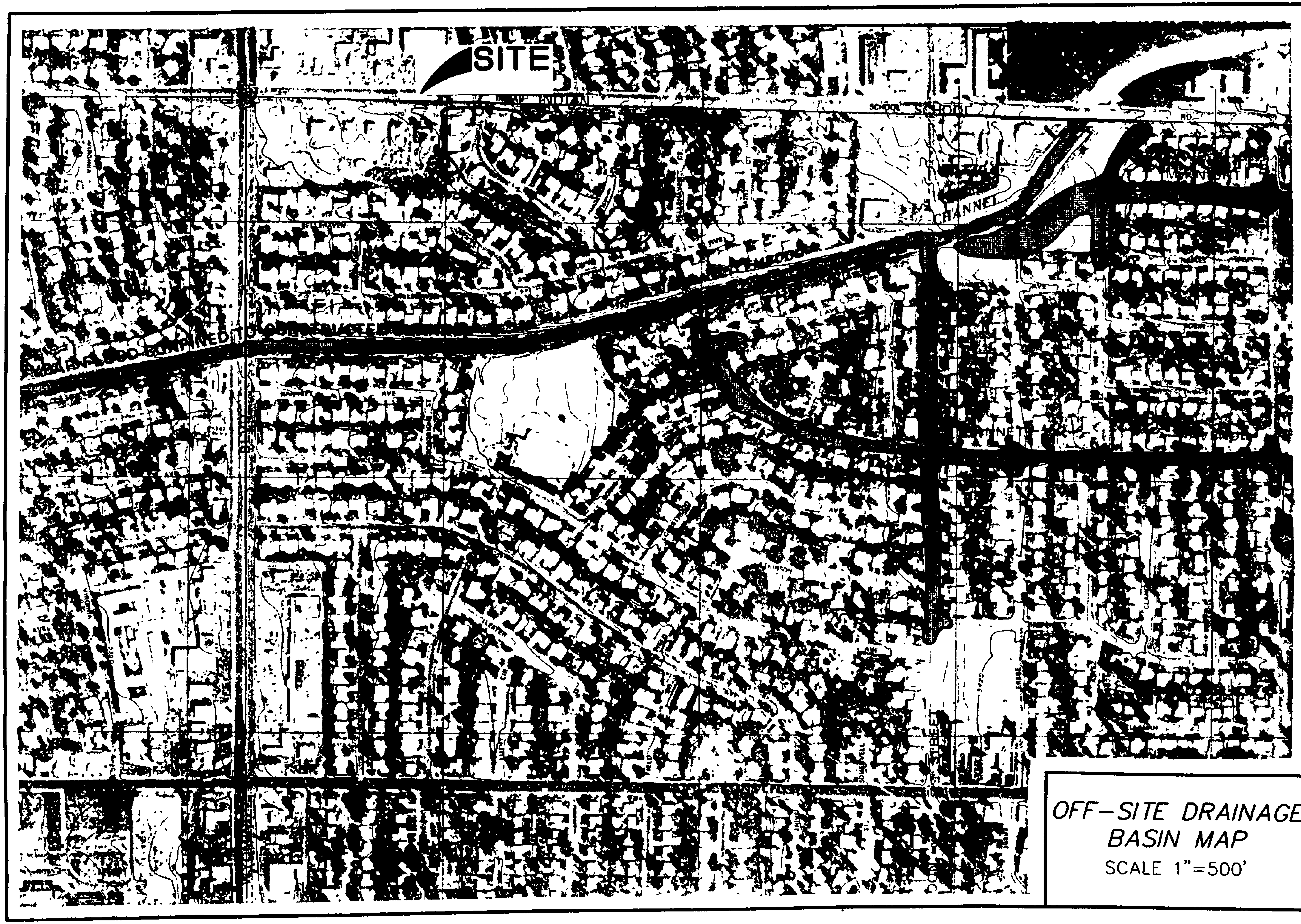
PARTIAL HYDROGRAPH 112.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.667	23.2	3.333	.5	5.000	.2	6.667	.0
.333	.0	2.000	8.8	3.667	.3	5.333	.2	7.000	.0
.667	.0	2.333	2.9	4.000	.2	5.667	.2	7.333	.0
1.000	.1	2.667	1.3	4.333	.2	6.000	.2		
1.333	3.0	3.000	.8	4.667	.2	6.333	.1		

RUNOFF VOLUME = 1.61035 INCHES = 1.2132 ACRE-FEET
PEAK DISCHARGE RATE = 26.00 CFS AT 1.600 HOURS BASIN AREA = .0141 SQ. MI.

```
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 14:13:31
```



OFF-SITE DRAINAGE
BASIN MAP
SCALE 1"=500'

PROJECT: Mobile S&G

DATE: _____

LARRY READ & ASSOCIATES
Civil Engineers

CALCULATIONS

By: JRL Pg: 1 of 3

Determine Time To Peak for Basin 'D'

D = 1350' to end of channel @ east alley

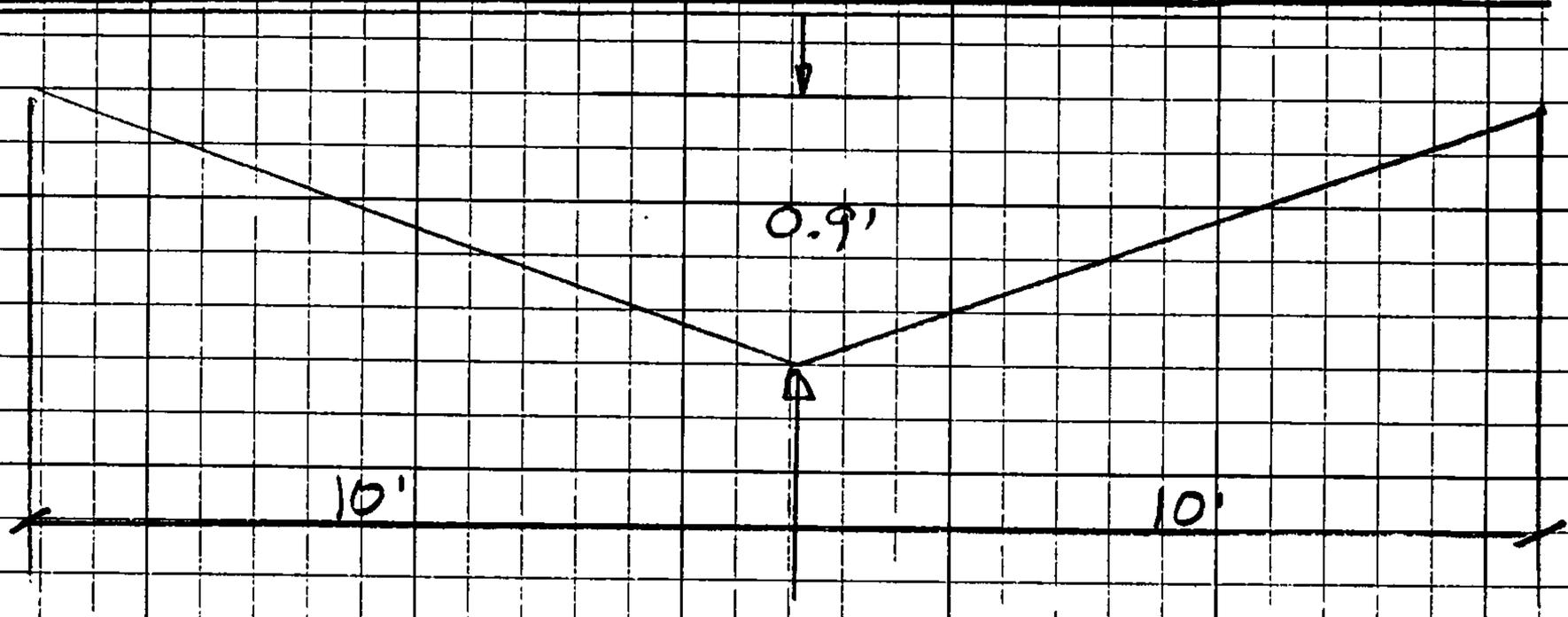
S = 8'/1350' = 0.593%

$$tc = \left[\frac{990}{0.7 * \sqrt{.593}} + \frac{1100}{2 * \sqrt{.593}}\right] \div 3600 = 0.327 \text{ hr}$$

(19.6 min)

$$tp = \frac{2}{3}(19.6) = 13.09 \text{ min } (0.218 \text{ hr}) >$$

East and South Alley Configuration & Capacity (Channel to West Property Line)



Slope in East Alley & South Alley to Prop Line

S = 1'/110' = 0.91%

$$Q_{CAP} = A * \frac{1.486}{n} R^{2/3} S^{1/2}$$

A = 9 ft²

R = A/P = 9/20.1 = 0.45

S = 0.91%

n = 0.013 (Asphalt)

Q_{CAP} = 57.6 cfs >> Q_{100} = 22.9 cfs (Basin 'D')

OK

SOUTH ALLEY CONFIGURATION & CAPACITY (WEST PROPERTY LINE TO WYOMING)

CONFIGURATION - SAME AS ABOVE

CAPACITY

S = 6/740 = 0.81%

A = 9 FT S

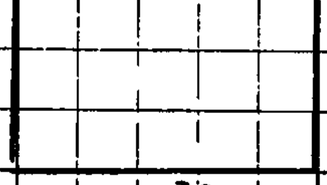
R = A/P = 0.95

n = 0.025 (GRASS)

Q_{CAP} = 28.2 cfs > Q_{100} = 26.3 cfs (RATIO = 13)

ASSUME Q_{CAP} IS OK SINCE Tp = 1.6 hrs. VS. OTHER SMALL BASINS BETWEEN SITE & WYOMING Tp = 1.5 hrs. THE PEAKS WILL NOT ADD DIRECTLY.

CHECK CAPACITY OPENINGS IN SOUTH WALL



A = 0.19 SF / OPENING

L = 1.75"

A = VERTICAL / BROAD CREST WEIR C = 2.8 (KING & BRATER)

$Q_{CAP} = CLH^{3/2}$

assume h = 0.5' d = 0.9' (h to center)

$Q = 2.8(1.75)(0.5)^{3/2} = 1.73$ cfs / opening

Q_{CAP} = 12 openings * 1.73 cfs / opening = 20.7 cfs

Q_{CAP} = 20.7 >> Q_{100} = 3.6 cfs OK

PROJECT: MOBILE S&B

DATE: _____

LARRY READ & ASSOCIATES
Civil Engineers

CALCULATIONS

By: LRA Pg: 3 of 3

Check Q_{CAP} AS ORIFICES

$Q = CA\sqrt{2gh}$ $\quad C = 0.607$ (VERTICAL, SHARD EDGE, FREE DISCHARGE KING'S HANDBOOK 4-7)

$Q = (0.607)(.19)\sqrt{2 * 32.2 * 0.5} = 0.65$ cfs/opening

$Q_{CAP} = 12$ openings $* 0.65$ cfs/opening $= 7.8$ cfs ← CONTROL

$Q_{CAP} = 7.8$ cfs $> Q_{100} = 3.6$ cfs OK

NOTE: CAPACITY OF OPENINGS IN NORTH WALL OK SINCE $Q_{100} = 2.7$ cfs (BASIN C)

```
START                TIME=0.0   PUNCH CODE=0   PRINT LINES=-6
*
*
    COMPUTE 100 YR. 6 HR. HYDROGRAPHS.

*S
*
*S  ------------------------------------
*S  ---      DEVELOPED  CONDITIONS    ---
*S  --       USING -  6 HOUR STORM     --
*S  ---  PER COA DPM SECTION 22.2     ---
*S  ---RAINFALL IS ZONE 3 (FIG. A-1)---
*S  ------------------------------------
*
*S  FILE NAME MOBILES&G.DAT
*S
*
*
RAINFALL             TYPE=-1   RAIN QUARTER=0.0   RAIN ONE=2.14
                     RAIN SIX=2.60   RAIN DAY=3.10   DT=.033333
*S
*S BASIN A
*S
*
COMPUTE NM HYD       ID=1 HYD NO=101.1 DA=.000415   PER A=0
                     PER B=0 PER C=0 PER D=100 TP=-0.133   RAIN=-1
PRINT HYD            ID=1 CODE=10
*S
*S BASIN B


COMPUTE NM HYD       ID=2 HYD NO=102.1 DA=.000261   PER A=0
                     PER B=0 PER C=0 PER D=100 TP=-0.133   RAIN=-1
PRINT HYD            ID=2 CODE=10
*S
*S BASIN C
*S
*
COMPUTE NM HYD       ID=3 HYD NO=103.1 DA=.000858   PER A=0
                     PER B=2.4 PER C=0 PER D=97.6 TP=-0.133   RAIN=-1
PRINT HYD            ID=3 CODE=10
*S
*S BASIN D
*S
*
COMPUTE NM HYD       ID=4 HYD NO=104.1 DA=.012592   PER A=0
                     PER B=31 PER C=31 PER D=38 TP=-0.218   RAIN=-1
PRINT HYD            ID=4 CODE=10
*S
*S
*S  DUE TO SHORT DISTANCES, ON-SITE BASINS 'B' AMD 'C' ARE ADDED DIRECTLY
*S  TO DETERMINE TOTAL RUNOFF FROM TO THE SOUTH ALLEY
*S
*S
    HYD              ID=10 HYD NO=110.0 ID I=2 ID II=3
...NT HYD            ID=10 CODE=10
*S
*S  DISCHARGE FROM BASIN D IS COMPUTED AT END OF CONCRETE CHANNEL ON THE
*S  ON THE EAST SIDE OF THE SITE.  SEE HAND CALCULATIONS FOR CHANNEL CAPACITY
*S  CHECK.  THIS RUNOFF IS THEN ROUTED THROUGH THE ALLEYS AND ADDED TO
```

```
*S  BASIN 'A' RUNOFF.  THIS TOTAL IS COMBINED WITH ON-SITE RUNOFF TO DETERMINE
*S  CAPACITY IN ALLEY SOUTH OF THIS SITE TO WYOMING
*S

   PUTE RATING CURVE  CID=1 VS NO=3 SEGS=1
                      MIN ELEV=0.10  MAX ELEV=1.00
                      CH SLP=0.0091 FP SLP=0.0091 N=-0.013 DIST =20
                      DIST  ELEV   DIST  ELEV  DIST  ELEV
                      0.0   1.00   10.0  0.10  20.0  1.00
COMPUTE TRAVEL TIME ID=11 REACH NO=1  NO VS =1    L=135 FT
                    SLP = .0091
ROUTE               ID=11 HYD NO 111.0 INFLOW ID=4 DT=0.0
ADD HYD             ID=12 HYD NO=112.0 ID I=11 ID II=1
PRINT HYD           ID=12 CODE=10
*S
*S
ADD HYD             ID=13 HYD NO=112.0 ID I=12 ID II=10
```

```
*S
PRINT HYD              ID=13 CODE=10
FINISH
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/13/1996
INPUT FILE = A:\MOBILES&G.DAT USER NO.= CINFRNNM.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
										PAGE = 1
START										TIME= .00
*S COMPUTE 100 YR. 6 HR. HYDROGRAPHS.										
*S										
*S ----------										
*S --- DEVELOPED CONDITIONS ---										
*S -- USING - 6 HOUR STORM --										
*S --- PER COA DPM SECTION 22.2 ---										
*S ---RAINFALL IS ZONE 3 (FIG. A-1)---										
*S ----------										
*S FILE NAME MOBILES&G.DAT										
*S										
RAINFALL TYPE= 1										RAIN6= 2.600
*S										
*S BASIN A										
*S										
COMPUTE NM HYD	101.10	-	1	.00042	1.34	.052	2.35524	1.500	5.058	PER IMP= 100.00
*S										
*S BASIN B										
*S										
COMPUTE NM HYD	102.10	-	2	.00026	.85	.033	2.35524	1.500	5.079	PER IMP= 100.00
*S										
*S BASIN C										
*S										
COMPUTE NM HYD	103.10	-	3	.00086	2.74	.106	2.32082	1.500	4.990	PER IMP= 97.60
*S										
*S BASIN D										
*S										
COMPUTE NM HYD	104.10	-	4	.01259	22.90	1.055	1.57114	1.600	2.841	PER IMP= 38.00
*S										
*S										
*S DUE TO SHORT DISTANCES, ON-SITE BASINS 'B' AMD 'C' ARE ADDED DIRECTLY										
*S TO DETERMINE TOTAL RUNOFF FROM TO THE SOUTH ALLEY										
*S										
*S										
ADD HYD	110.00	2& 3	10	.00112	3.59	.139	2.32840	1.500	5.010	
*S										
*S DISCHARGE FROM BASIN D IS COMPUTED AT END OF CONCRETE CHANNEL ON THE										
*S ON THE EAST SIDE OF THE SITE. SEE HAND CALCULATIONS FOR CHANNEL CAPACITY										
*S CHECK. THIS RUNOFF IS THEN ROUTED THROUGH THE ALLEYS AND ADDED TO										
*S BASIN 'A' RUNOFF. THIS TOTAL IS COMBINED WITH ON-SITE RUNOFF TO DETERMINE										
*S CAPACITY IN ALLEY SOUTH OF THIS SITE TO WYOMING										
*S										
*S										
ROUTE	111.00	4	11	.01259	22.93	1.055	1.57114	1.600	2.846	
ADD HYD	112.00	11& 1	12	.01301	23.85	1.107	1.59610	1.600	2.865	
*S										
*S										
ADD HYD	112.00	12&10	13	.01413	26.33	1.246	1.65411	1.567	2.912	
*S										
FINISH										

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 05/13/1996
         START TIME (HR:MIN:SEC) = 15:40:46     USER NO.= CINFRNNM.I01
         INPUT FILE = A:\MOBILES&G.DAT

START                TIME=0.0  PUNCH CODE=0  PRINT LINES=-6
*
*
*S  COMPUTE 100 YR. 6 HR. HYDROGRAPHS.
*S
*S
*
*S  ----------------------------------
*S  ---     DEVELOPED  CONDITIONS   ---
*S  --       USING -  6 HOUR STORM    --
*S  ---  PER COA DPM SECTION 22.2   ---
*S  ---RAINFALL IS ZONE 3 (FIG. A-1)---
*S  ----------------------------------
*
*S  FILE NAME MOBILES&G.DAT
*S
*
*
RAINFALL             TYPE=-1  RAIN QUARTER=0.0  RAIN ONE=2.14
                     RAIN SIX=2.60  RAIN DAY=3.10  DT=.033333

                COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                DT =    .033333 HOURS       END TIME =     5.999940 HOURS
*S
*S BASIN A
*S
*
COMPUTE NM HYD       ID=1 HYD NO=101.1 DA=.000415  PER A=0
                     PER B=0 PER C=0 PER D=100 TP=-0.133  RAIN=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.6421    CFS   UNIT VOLUME =    .9924       B =   526.28      P60 = 2.1400
    AREA =      .000415 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333

PRINT HYD            ID=1 CODE=10

                                PARTIAL HYDROGRAPH   101.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000        .0         1.333        .4         2.667        .0         4.000        .0         5.333        .0
     .333        .0         1.667        .7         3.000        .0         4.333        .0         5.667        .0
     .667        .0         2.000        .3         3.333        .0         4.667        .0         6.000        .0
    1.000        .0         2.333        .1         3.667        .0         5.000        .0         6.333        .0

    RUNOFF VOLUME =     2.35524 INCHES     =        .0521 ACRE-FEET
    PEAK DISCHARGE RATE =       1.34 CFS  AT   1.500 HOURS   BASIN AREA =   .0004 SQ. MI.


*S
*S BASIN B
*S
*
COMPUTE NM HYD       ID=2 HYD NO=102.1 DA=.000261  PER A=0
                     PER B=0 PER C=0 PER D=100 TP=-0.133  RAIN=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.0328    CFS   UNIT VOLUME =    .9883       B =   526.28      P60 = 2.1400
    AREA =      .000261 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333

PRINT HYD            ID=2 CODE=10

                                PARTIAL HYDROGRAPH   102.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000        .0         1.333        .3         2.667        .0         4.000        .0         5.333        .0
```

.333	.0	1.667	.4	3.000	.0	4.333	.0	5.667	.0
.667	.0	2.000	.2	3.333	.0	4.667	.0	6.000	.0
1.000	.0	2.333	.0	3.667	.0	5.000	.0		

RUNOFF VOLUME = 2.35524 INCHES = .0328 ACRE-FEET
PEAK DISCHARGE RATE = .85 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

```
*S
*S BASIN C
*S
*
COMPUTE NM HYD      ID=3 HYD NO=103.1 DA=.000858  PER A=0
                    PER B=2.4 PER C=0 PER D=97.6 TP=-0.133  RAIN=-1
```

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.3136 CFS UNIT VOLUME = .9962 B = 526.28 P60 = 2.1400
AREA = .000837 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .133355HR TP = .133000HR K/TP RATIO = 1.002670 SHAPE CONSTANT, N = 3.520804
UNIT PEAK = .49830E-01CFS UNIT VOLUME = .8695 B = 321.84 P60 = 2.1400
AREA = .000021 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

```
PRINT HYD           ID=3 CODE=10
```

PARTIAL HYDROGRAPH 103.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.333	.9	2.667	.1	4.000	.0	5.333	.0
.333	.0	1.667	1.4	3.000	.0	4.333	.0	5.667	.0
.667	.0	2.000	.7	3.333	.0	4.667	.0	6.000	.0
1.000	.0	2.333	.1	3.667	.0	5.000	.0	6.333	.0

RUNOFF VOLUME = 2.32082 INCHES = .1062 ACRE-FEET
PEAK DISCHARGE RATE = 2.74 CFS AT 1.500 HOURS BASIN AREA = .0009 SQ. MI.

```
*S
*S BASIN D
*S
*
COMPUTE NM HYD      ID=4 HYD NO=104.1 DA=.012592  PER A=0
                    PER B=31 PER C=31 PER D=38 TP=-0.218  RAIN=-1
```

K = .118810HR TP = .218000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 11.551 CFS UNIT VOLUME = .9991 B = 526.28 P60 = 2.1400
AREA = .004785 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .198349HR TP = .218000HR K/TP RATIO = .909858 SHAPE CONSTANT, N = 3.892619
UNIT PEAK = 12.461 CFS UNIT VOLUME = .9990 B = 347.95 P60 = 2.1400
AREA = .007807 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

```
PRINT HYD           ID=4 CODE=10
```

PARTIAL HYDROGRAPH 104.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.667	20.7	3.333	.4	5.000	.1	6.667	.0
.333	.0	2.000	7.7	3.667	.3	5.333	.1	7.000	.0
.667	.0	2.333	2.6	4.000	.2	5.667	.1	7.333	.0
1.000	.0	2.667	1.2	4.333	.2	6.000	.1		
1.333	2.3	3.000	.7	4.667	.1	6.333	.0		

RUNOFF VOLUME = 1.57114 INCHES = 1.0551 ACRE-FEET
PEAK DISCHARGE RATE = 22.90 CFS AT 1.600 HOURS BASIN AREA = .0126 SQ. MI.

```
*S
*S
*S  DUE TO SHORT DISTANCES, ON-SITE BASINS 'B' AMD 'C' ARE ADDED DIRECTLY
*S  TO DETERMINE TOTAL RUNOFF FROM TO THE SOUTH ALLEY
*S
*S
ADD HYD             ID=10 HYD NO=110.0 ID I=2 ID II=3
PRINT HYD           ID=10 CODE=10
```

PARTIAL HYDROGRAPH 110.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.333	1.1	2.667	.1	4.000	.0	5.333	.0
.333	.0	1.667	1.8	3.000	.1	4.333	.0	5.667	.0
.667	.0	2.000	.9	3.333	.0	4.667	.0	6.000	.0
1.000	.0	2.333	.2	3.667	.0	5.000	.0	6.333	.0

RUNOFF VOLUME = 2.32840 INCHES = .1390 ACRE-FEET
PEAK DISCHARGE RATE = 3.59 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

```
*S
*S  DISCHARGE FROM BASIN D IS COMPUTED AT END OF CONCRETE CHANNEL ON THE
*S  ON THE EAST SIDE OF THE SITE.  SEE HAND CALCULATIONS FOR CHANNEL CAPACITY
*S  CHECK.  THIS RUNOFF IS THEN ROUTED THROUGH THE ALLEYS AND ADDED TO
*S  BASIN 'A' RUNOFF.  THIS TOTAL IS COMBINED WITH ON-SITE RUNOFF TO DETERMINE
*S  CAPACITY IN ALLEY SOUTH OF THIS SITE TO WYOMING
*S
*S
COMPUTE RATING CURVE  CID=1 VS NO=3 SEGS=1
                      MIN ELEV=0.10  MAX ELEV=1.00
                      CH SLP=0.0091 FP SLP=0.0091 N=-0.013 DIST =20
                      DIST  ELEV   DIST  ELEV  DIST  ELEV
                      0.0   1.00   10.0  0.10  20.0  1.00
```

RATING CURVE VALLEY SECTION 3.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.10	.00	.00	.00
.15	.02	.02	1.05
.19	.10	.14	2.11
.24	.22	.42	3.16
.29	.40	.90	4.21
.34	.62	1.63	5.26
.38	.90	2.66	6.32
.43	1.22	4.01	7.37
.48	1.60	5.72	8.42
.53	2.02	7.84	9.47
.57	2.49	10.38	10.53
.62	3.02	13.38	11.58
.67	3.59	16.88	12.63
.72	4.21	20.89	13.68
.76	4.89	25.46	14.74
.81	5.61	30.60	15.79
.86	6.38	36.35	16.84
.91	7.20	42.72	17.89
.95	8.08	49.76	18.95
1.00	9.00	57.47	20.00

```
COMPUTE TRAVEL TIME ID=11 REACH NO=1  NO VS =1    L=135 FT
                    SLP = .0091
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.047	.025	.02	.0418
.095	.100	.14	.0263
.142	.224	.42	.0201
.189	.399	.90	.0166
.237	.623	1.63	.0143
.284	.898	2.66	.0127

.332	1.222	4.01	.0114
.379	1.596	5.72	.0105
.426	2.019	7.84	.0097
.474	2.493	10.38	.0090
.521	3.017	13.38	.0085
.568	3.590	16.88	.0080
.616	4.213	20.89	.0076
.663	4.886	25.46	.0072
.711	5.609	30.60	.0069
.758	6.382	36.35	.0066
.805	7.205	42.72	.0063
.853	8.078	49.76	.0061
.900	9.000	57.47	.0059

```
ROUTE              ID=11 HYD NO 111.0 INFLOW ID=4 DT=0.0
ADD HYD            ID=12 HYD NO=112.0 ID I=11 ID II=1
PRINT HYD          ID=12 CODE=10
```

PARTIAL HYDROGRAPH 112.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.667	21.6	3.333	.4	5.000	.1	6.667	.0
.333	.0	2.000	8.2	3.667	.3	5.333	.1	7.000	.0
.667	.0	2.333	2.7	4.000	.2	5.667	.1	7.333	.0
1.000	.0	2.667	1.3	4.333	.2	6.000	.1		
1.333	2.3	3.000	.7	4.667	.2	6.333	.0		

RUNOFF VOLUME = 1.59610 INCHES = 1.1072 ACRE-FEET
PEAK DISCHARGE RATE = 23.85 CFS AT 1.600 HOURS BASIN AREA = .0130 SQ. MI.

```
*S
*S
ADD HYD            ID=13 HYD NO=112.0 ID I=12 ID II=10
*S
PRINT HYD          ID=13 CODE=10
```

PARTIAL HYDROGRAPH 112.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.667	23.4	3.333	.5	5.000	.2	6.667	.0
.333	.0	2.000	9.0	3.667	.3	5.333	.2	7.000	.0
.667	.0	2.333	2.9	4.000	.2	5.667	.2	7.333	.0
1.000	.1	2.667	1.4	4.333	.2	6.000	.2		
1.333	3.5	3.000	.8	4.667	.2	6.333	.1		

RUNOFF VOLUME = 1.65411 INCHES = 1.2462 ACRE-FEET
PEAK DISCHARGE RATE = 26.33 CFS AT 1.567 HOURS BASIN AREA = .0141 SQ. MI.

```
FINISH
```

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 15:40:52