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Final Drainage Report

(US 60)Overpass at 43rd Avenue/Camelback Road

24328-HPH

January 8, 2001

GRAND AVENUE

Project No. 060-B-500
TRACS No. 060 MA 157 H 5532 01 D

Contract No. 00-56

Arizona Department of Transportation
Intermodal Transportation Division
Valley Project Management Group

Prepared by

Michael Baker Jr., Inc.
Phoenix, Arizona.

TABLE OF CONTENTS

SECTION 1.0 INTRODUCTION **1**

SECTION 2.0 PROJECT AREA **1**

SECTION 3.0 EXISTING DRAINAGE CONDITION **1**

SECTION 4.0 ADOT DESIGN CRITERIA **2**

4.1 Offsite Criteria 3

4.2 Roadway Drainage Criteria 3

SECTION 5.0 HYDROLOGY **4**

SECTION 6.0 HYDRAULIC DESIGN **5**

6.1 Detention Basins 6

6.2 Roadway Drainage 6

SECTION 7.0 REFERENCES **7**

LIST OF FIGURES

FIGURE 1. VICINITY MAP 2

APPENDICES

Appendix A: Hydrologic Computations

Appendix B: Detention Basins

Appendix C: Rational Method and Catch Basin Location

Appendix D: Proposed Storm Drain System

Appendix E: FEMA Flood Insurance Rate Map

Appemdix F: Roadway Construction Plans

Draft Final Drainage Report
Grand Avenue (US 60)
Grand Avenue Overpass at 43rd Avenue/Camelback Road

Arizona Department of Transportation

January 2001

SECTION 1.0 INTRODUCTION

This report has been prepared to document the assumptions, calculations and procedures used to design the drainage improvements for the Grand Avenue Intersection of 43rd Avenue and Camelback Road. A grade separation for Grand Avenue is being designed at this intersection. The impact of the improved intersection on the offsite drainage flow is documented within the report. On-site pavement drainage and detention basin calculations are also included.

SECTION 2.0 PROJECT AREA

The project area is within Maricopa County, the City of Phoenix and the City of Glendale (see Figure 1 Vicinity Map). The project is to design a grade separation for Grand Avenue (US 60) at the intersection of 43rd Avenue and Camelback Road. The project study limits are along Grand Avenue starting at Missouri Avenue and ending at 39th Avenue. The project encompasses an area of approximately 47.32 acres.

SECTION 3.0 EXISTING DRAINAGE CONDITION

The land use within the study area is primarily single family residences with industrial and commercial businesses along Grand Avenue. The natural drainage of the area is from the northeast to the southwest toward Grand Avenue at approximately 0.4 percent. The flow generally follows the street alignments until the capacity of the streets is exceeded. The flow then overtops the curbs and sheet flows through the area. This flow is blocked by the elevated railroad tracks (BNSF Railroad) along Grand Avenue creating a ponding area. Grand Avenue slowly drains southeast toward the Grand Canal.

A FEMA designated floodplain is located along Grand Avenue north of Camelback Road. A copy of the FEMA Flood Insurance Rate Map (FIRM) is provided in Appendix E. The reconstruction of the intersection will impact the ponding volume reflected on the FIRM. This volume displacement, however, will be compensated for in the proposed detention basins. No change to the FEMA floodplain limits is anticipated.

The City of Phoenix has several existing storm drains in the project area. There is a 54-inch diameter pipe in 43rd Avenue that drains to the south, crossing Grand Avenue and the BNSF railroad. There is a 39-inch diameter pipe in Camelback Road that ties into the 54-inch pipe at the intersection of Grand Avenue.

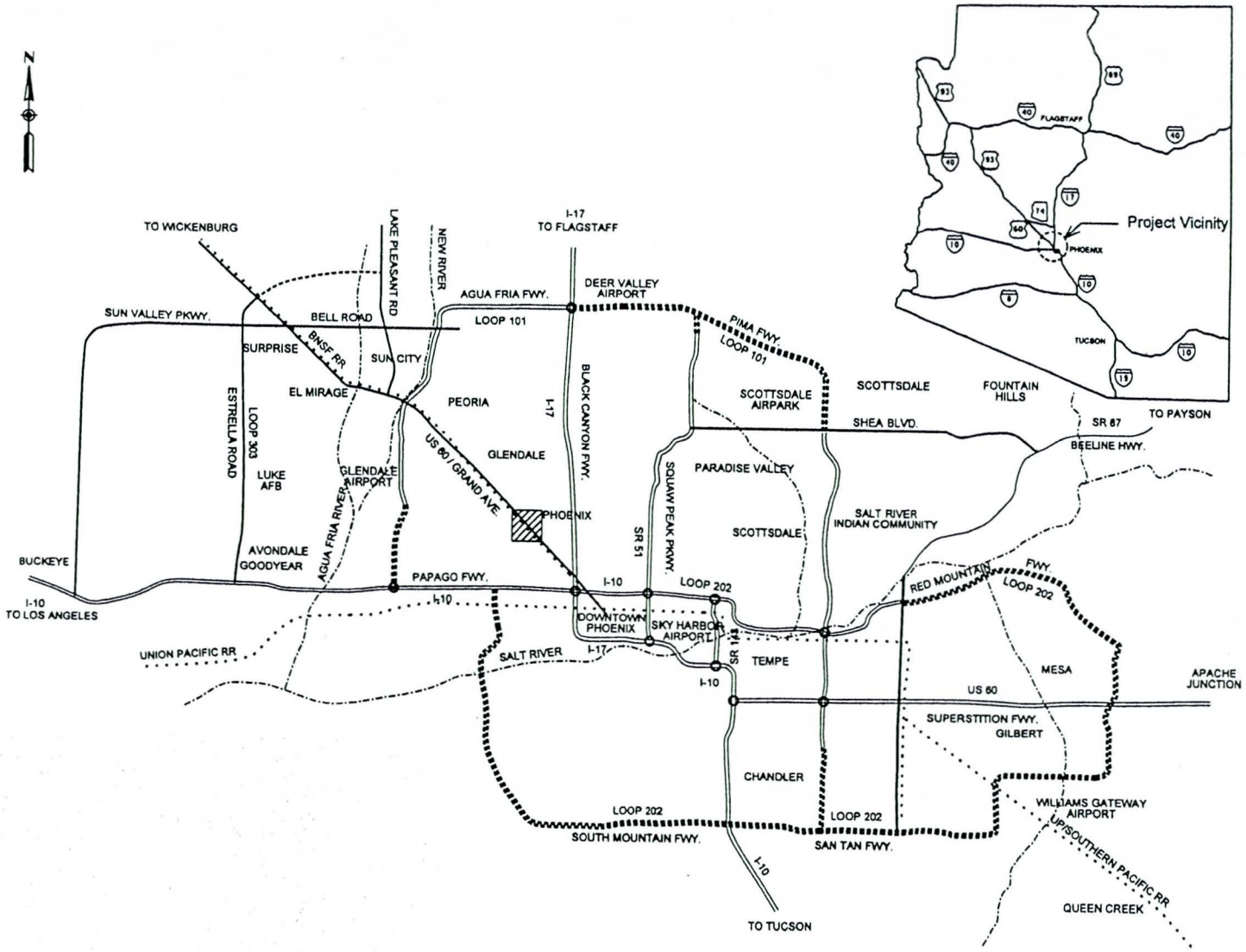


FIGURE 1
VICINITY MAP

SECTION 4.0 ADOT DESIGN CRITERIA

The drainage design will have to address offsite flows and show that no increase of flows or ponding occurs to adjacent properties for the 50-year and the 100-year storms. The offsite drainage criteria will follow Chapter 600, Highway drainage Design, ADOT Roadway Design Guidelines (Reference 1).

4.1 OFFSITE DRAINAGE CRITERIA

The following criteria have been established by ADOT for offsite drainage design:

Design Storm Frequency:	50-yr storm
Rainfall Duration:	6-hour duration for total watershed area less than 1.0 square mile; 24-hour duration for total watershed areas larger than 1.0 square mile.
Hydrologic Methods:	HEC-1 for areas larger than 160 acres; Rational Method for areas less than 160 acres and for pavement drainage.

4.2 ROADWAY DRAINAGE CRITERIA

Design Storm Frequency:	10-year storm
Ponding Depth:	Cannot exceed the height of the curb for 10-year storm.
Flow Spread:	For 10-year storm: the allowable spread should not exceed the width of the roadway gutter, shoulder, parking lane and/or distress lane plus on roadways with more than one lane in each direction the spread may encroach upon one-half of the adjacent lane. For 50-year storm on all roadways, the allowable ponding width should not exceed the width of the roadway gutter, shoulder, parking lane and/or distress lane plus on roadways with more than one lane in each direction the spread may encroach upon the full adjacent lane.
Storm Drain Design:	For 10-year storm: the Hydraulic Grade Line will be at a minimum 0.5 feet below the top of the catch basin grate.

SECTION 5.0 HYDROLOGY

The hydrology prepared for this report follows the methodologies outlined in ADOT's *Roadway Design Guidelines* (Reference 1) and *Highway Drainage Design Manual, Hydrology* (Reference 2).

ADOT's requirement for determining discharges is to use HEC-1 for drainage areas larger than 160 acres. Since the drainage area for this project exceeds 160 acres, HEC-1 was used for the hydrologic modeling. Since the contributing drainage area is greater than 1.0 square mile, the duration used was for a 24-hour storm (per the ADOT Hydrology Manual Reference 2).

The project area was previously analyzed and modeled as part of the Maryvale Area Drainage Master Study (ADMS) for the Flood Control District of Maricopa County in February 1997 (Reference 3). The HEC-1 Hydrologic Model developed for the Maryvale ADMS was utilized in establishing the offsite flows for the project area. The Maryvale HEC-1 topographic mapping was based on NGVD, 1929 datum. The hydrology for the Maryvale study was developed for the 100-year, 24-hour storm.

The Flood Control District of Maricopa County prepared the Maryvale ADMS Floodplain Mitigation Study (Reference 1) in November 1997 that recommended design solutions to the flooding problems in this area. The recommended solution was to provide detention and a storm drain system for the 10-year, 6-hour storm. The recommended future detention basin would store 38-acre ft of runoff and the storm drain would convey 410 cfs of flows.

Hydrology for this project was developed for the existing and proposed scenarios. The rainfall intensity in the model was adjusted to determine the discharge for the 50-year, 24-hour storm and for the 10-year, 24-hour storm. The proposed model included revisions to the drainage area due to the road construction and the addition of the retention basins. The topographic mapping for the ADOT project used NAVD 1988 datum. A conversion factor of -2.2 was used to convert the ADOT mapping to NGVD 1929 for use in Maryvale HEC-1.

A HEC-1 model prepared by URS Greiner Woodward Clyde (URS) for the Design Concept Report for Grand Avenue – 43rd Avenue and Camelback Road (Reference 5) was not used because the duration of the storm used was for the 12-hour and 48-hour storms instead of the 6 and 24 hour storms. The discharges from the URS report were significantly less than discharges calculated by Baker. These lower discharges are due to the difference in storm duration.

Hydrology was developed for the 'with' (proposed) and 'without' (existing) detention basins scenarios. The HEC-1 Schematic is shown in Appendix A. The 'with' detention basin model included the addition of two basins. In the HEC-1 model RES 16B modeled Detention Basin 3 which is located east of Grand and west of 43rd Avenue. This is the largest basin and has a volume of 96.2 acre-feet. Basins 1 and 2 located south of Camelback and east of Grand Avenue were modeled as one basin designated RES 22B. The combined volume of Basins 1 and 2 is approximately 13.5 acre-feet.

The two models were compared to verify that the new construction did not increase the drainage flows or create additional ponding onto adjacent properties for the 50-year and 100-year storms. Table 1 shows the results of the HEC-1 models in the area of the 43rd Avenue Project. The results show that the detention basins at 43rd Avenue help to decrease the flows in the area. The improvements at 51st Avenue and Grand Avenue also contribute to decreasing the flows at 43rd Avenue.

Printouts of the 51st Avenue and 43rd Avenue HEC-1 Summary and a diskette containing the electronic input/output files are located in Appendix A.

Table 1 Results of the Hydrologic Analyses

Location		10-yr, 24hr (cfs)		50-yr, 24hr (cfs)		100-yr, 24hr (cfs)	
		Proposed	Existing	Proposed	Existing	Proposed	Existing
Along Grand Ave to southeast	RGR4	156	220	389	407	492	504
Upstream of Detention Basin #3	C1622E	446	530	991	1087	1299	1345
Downstream of Detention Basin #3	RGR5	288	529	955	1083	1266	1343
Intersection of 43rd & Camelback	CCB43	399	689	1160	1311	1499	1594

6.0 HYDRAULIC DESIGN

6.1 DETENTION BASINS

The drainage system is designed to pass storm water through the project by way of a system of storm drains and detention basins. The drainage system layout is shown on the roadway plan sheets in Appendix F. Three detention basins are proposed. Basin 3 is the largest and is located west of 43rd Avenue and east of Grand Avenue. This basin will intercept overland flow from the north and east and will detain flow from Grand Avenue as well as from the 43rd Avenue entrance/exit street connectors (Street Connectors '43C' and '43D'). Catch basins will intercept street flow along 43rd Avenue and discharge into a pipe that will convey the flow to Basin 3.

The other two basins are south of Camelback Road, east of Grand Avenue and on either side of Camelback Road exit street connector (Street Connector 'CB'). Basin 2 is connecting to Basin 1, and will detain roadway drainage and some local sheet flow. Basin 1 will receive flows from Camelback Road by way of a catch basin and storm

drain. When the capacity of Basin 1 is reached, storm water will outflow to the southeast as it does today.

The combined basins provide a total storage capacity of approximately 109.8-acre-ft, which is considerably more than the 38 acre-ft proposed by the Maryvale ADMS. The storm water detention system will also replace the theoretical ponding storage removed from the FEMA floodplain due to the placement of the proposed roadway embankment. The eliminated storage due to the embankment is approximately 18 acre-feet.

The Flood Control District of Maricopa County Drainage Design Manual Volume 1, Hydrology (Reference 6) criteria for retention is for a site to retain all on-site drainage generated from a 100-year, 2-hour storm. By this criteria the 43rd Avenue and Grand Avenue construction site would require a retention volume of approximately 6.7 acre-feet. This volume has also been met by the 109.8 acre-feet of storage provided.

The volume calculations are included in Appendix B.

Since ADOT will maintain Detention Basins 1 and 2, these basins will meet ADOT design criteria such as fencing, vehicle access, service road around the perimeter, 3:1 maximum slopes, and gravity drain. Detention Basin 3 will be maintained by the City of Glendale and was designed to Glendale's Design Guidelines (Reference 7).

The layouts of the detention basins were set so that the outfall would be gravity flow to the adjacent existing storm drains. Basin 3 will outfall to the existing 54-inch storm drain in 43rd Avenue. Basin 1 will outfall to the existing 39-inch storm drain located in Camelback Road. A culvert is proposed to equalize the water level in Basins 1 and 2.

A 24-inch pipe will be used to drain the basins to the adjacent existing storm drain system. Calculations were performed to verify that the pipe would be able to drain the basins within 36-hours. The calculations are in Appendix B.

6.2 ROADWAY DRAINAGE

Roadway drainage facilities for this project were designed in accordance with Chapter 600, Highway Drainage Design, ADOT Roadway Design Guidelines (Reference 2).

The objective of highway drainage is to provide the necessary highway drainage facilities to allow the public to use the highway during times of significant runoff, to minimize the potential for adverse effects on adjacent properties, and to maintain existing drainage patterns. The goal in highway drainage is to minimize off-project impacts while maintaining an acceptable frequency of protection for the highway and roadway.

On-site drainage consisting of flows generated from the on-site paved areas was analyzed for a 10-year storm event utilizing the Rational Method illustrated on the following page.

$$Q = CIA$$

Q = Discharge, cfs

C = Runoff coefficient

I = Rainfall Intensity, inches per hour

A = Area, acres

A runoff coefficient (C) of 0.95 was used for the roadway. A minimum time of concentration of 10 minutes and Figure 3.2 from the FCDMC Hydrology Manual (Reference 6) was used in determining the rainfall intensity. This figure is included in Appendix C.

The discharges were determined and catch basins located and sized to control the flow spread within the allowable limits for a 10-year storm event. The spread was also checked to make sure that it met the allowable limits for a 50-year storm. The discharge calculation spreadsheets are in Appendix C. Catch basins were located at sump areas and at superelevation transitions to prevent run off from crossing the travel way. Flow spread and inlet capacities were determined utilizing HEC-22. The flow spread and the catch basin calculations are provided in Appendix C.

A storm drain system was designed to convey the pavement drainage from Grand Avenue, Connector 43C, 43D and CB to the new detention basins. Connector CA will discharge into existing storm drains in Grand Avenue and Camelback Road. A computer program from Haestad Methods, StormCAD, was used to design the storm drain system. The storm drain system was designed to have the hydraulic grade line for a 10-year storm event at least 0.5 feet below the catch basins grates. The StormCAD results and storm drain schematics are provided in Appendix D.

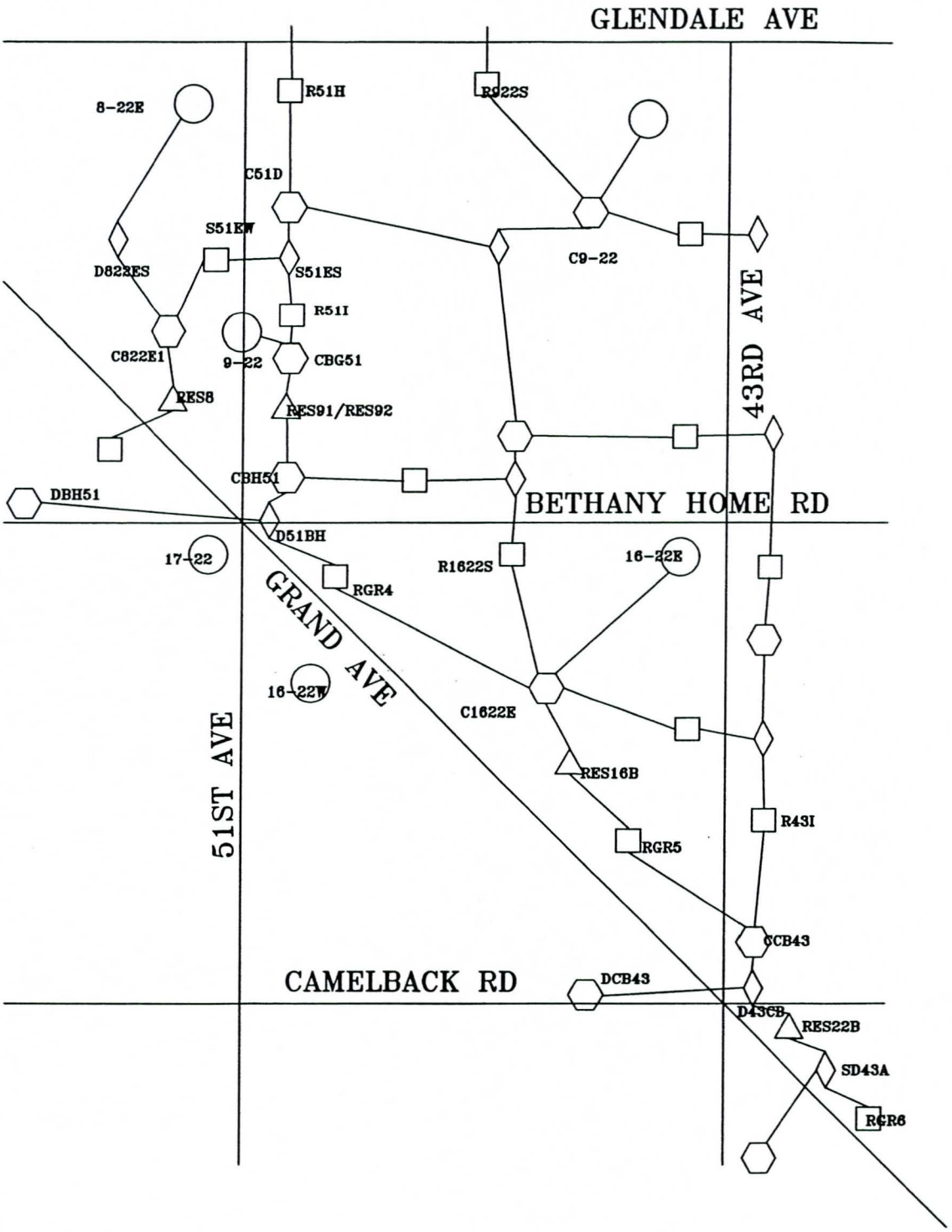
SECTION 7.0 REFERENCES

1. Arizona Department of Transportation, Roadway Design Guidelines-Metric, May 1996.
2. Arizona Department of Transportation, Highway Drainage Design Manual, Hydrology, Report Number: FHWA-AZ93-281, March 1993.
3. Wood, Patel & Associates, Inc., Maryvale Area Drainage Master Study, Hydrology, FCD #93-29, February 1997.
4. Wood, Patel & Associates, Inc., Maryvale Area Drainage Master Study, Floodplain Mitigation Study, FCD #93-29, November 1997.
5. URS Greiner Woodward Clyde, Preliminary Drainage Report, Grand Avenue (US 60), 43rd Avenue/Camelback Road, Design Concept Report, Contract 99-25, May 2, 2000.
6. Flood Control District of Maricopa County, Drainage Design Manual, Volume I, Hydrology, January, 1995.
7. City of Glendale, Design Guidelines for Site Development and Infrastructure Construction, 1997.

APPENDIX A
Hydrologic Computations

1. HEC-1 Disk with input and output
2. HEC-1 Schematic
3. Rainfall Calculations
4. Summary Print Out- Existing (without) & Proposed (with)
   a) 10-year
   b) 50-year
   c) 100-year

HEC-1 SCHEMATIC



*** O U T P U T D A T A ***

REVISED JUNE 1988 TO UPDATE COMPUTATION OF SHORT-DURATION VALUES

PRECIPITATION FREQUENCY VALUES FOR Maryvale ADMS.
PRIMARY ZONE NUMBER= 7
SHORT-DURATION ZONE NUMBER= 8

OPTION NUMBER 2 --- INPUT OF 12 PRECIP VALUES
ELEVATION 1200 FEET

POINT VALUES

DURATION	RETURN PERIOD 2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	500-YR	
5-MIN	.35	.44	.50	.59	.66	.72	.88	5-MIN
10-MIN	.52	.66	.76	.90	1.00	1.11	1.36	10-MIN
15-MIN	.64	.83	.96	1.14	1.28	1.42	1.75	15-MIN
30-MIN	.84	1.11	1.29	1.54	1.73	1.93	2.38	30-MIN
1-HR	1.03	1.37	1.59	1.92	2.16	2.41	2.98	1-HR
2-HR	1.12	1.47	1.73	2.08	2.36	2.63	3.27	2-HR
3-HR	1.14	1.55	1.82	2.20	2.49	2.78	3.45	3-HR
6-HR	1.23	1.68	1.99	2.41	2.73	3.06	3.81	6-HR
12-HR	1.30	1.82	2.16	2.64	3.01	3.37	4.22	12-HR
24-HR	1.37	1.95	2.34	2.87	3.28	3.69	4.63	24-HR

* IF YOUR SITE IS IN ARIZONA OR NEW MEXICO, PLEASE CONSULT THE FOLLOWING PAPER FOR REVISED DEPTH-AREA VALUES:
DEPTH-AREA RATIOS IN THE SEMI-ARID SOUTHWEST UNITED STATES
NOAA TECHNICAL MEMORANDUM NWS HYDRO-40
ZEHR AND MYERS
AUGUST 1984

INPUT DATA

PROJECT NAME=Maryvale ADMS.
ZONE= 7 SHORT-DURATION ZONE= 8
LATITUDE= .00 LONGITUDE= 100.00 ELEVATION= 1200
12-VALUE PRECIPITATION OPTION
PRECIPITATION VALUE:

1.20	1.70
2.00	2.40
2.80	3.00
1.40	2.00
2.30	2.50
3.20	3.90

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 *             JUN 09 1992              *
 *            VERSION 4.0.3E            *
 *                                      *
 *  RUN DATE  12/29/00  TIME  14:43:01  *
 *                                      *
 ****************************************
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*****************************
*
*    U.S. ARMY CORPS OF ENGINE
*    HYDROLOGIC ENGINEERING CE
*          609 SECOND STREET
*       DAVIS, CALIFORNIA 9561
*          (916) 551-1748
*
*****************************
```

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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTU
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   MBJ modified in July, 2000
   2          ID   MV2410yf.dat
   3          ID   Existing Condition
   4          ID   10Yr-24Hr Event
   5          ID   ****************************************************************************
   6          ID   MARYVALE ADMS - FCD#93-29: CH2M HILL & Wood/Patel & Associates
   7          ID   Model for Entire Study Area (Approximately 100 square miles)
   8          ID   Existing Conditions
   9          ID   100Yr-24Hr Event
  10          ID   Clark Unit Hydrograph
  11          ID   24-Hour SCS TYPE II Rainfall Pattern was used to determine TC & R
  12          ID   Green-Ampt Precipitation Losses
  13          ID   Model Prepared and Checked by David Dust and Jim Geisbush
  14          ID   MV100-24 (BASE79): SWW\132586\HEC-1
  15          ID   January 1997
  16          ID  ******************************************************************************
  17          ID   HEC-1 ELEMENT NOMENCLATURE
  18          ID   SUB-BASIN HYDROGRAPH:
  19          ID      Example: "17-32N": the sub-basin is Section 17, T3N, R2E
  20          ID
  21          ID   SUB-BASIN DIVERSION:
  22          ID      Example: "D1732S": is the southerly component of divert in Section 17
  23          ID
  24          ID   SUB-BASIN ROUTE:
  25          ID      Example: "R1732S": is the southerly flow route through Sec. 17, T3N, R2E
  26          ID
  27          ID   SUB-BASIN RESERVOIR ROUTE OR SURGE BASIN DIVERT:
  28          ID      Example: "RES17": corresponds to a reservoir route or surge basin divert
  29          ID                        in Sub-basin 17-##
  30          ID
  31          ID   RETENTION BASIN DIVERT:
  32          ID      Example: "RET17": corresponds to retention basin divert in
  33          ID                        Sub-Basin 17-##
  34          ID
  35          ID   SUB-BASIN COMBINE:
  36          ID      Example: "C17-32": corresponds to sub-basin combine in Sec. 17, T3N, R2E
  37          ID
  38          ID   STREET ROUTE:
  39          ID      Example: "RPA1": first route for Peoria Avenue
  40          ID      Example" "R67C": third route for 67th Avenue
  41          ID
  42          ID   STREET CAPACITY DIVERSION:
  43          ID      Example: "SPA1S": first diversion from Peoria Avenue to the south
  44          ID
  45          ID   STREET INTERSECTION DIVERSION:
  46          ID      Example: "RPA67": flow component along Peoria Avenue from diversion at
  47          ID                        Peoria Avenue and 67th Avenue
  48          ID      Example: "R67PA": flow component along 67th Avenue from diversion at
  49          ID                        Peoria Avenue and 67th Avenue
  50          ID
```

```
 51          ID   STREET INTERSECTION COMBINE:
 52          ID      Example: "CPA67": hydrograph combine at the intersection of Peoria Avenue
 53          ID                        and 67th Avenue
 54          ID
 55          ID   STREET COMBINE:
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 56          ID      Example: "CPA2": second hydrograph combine along Peoria Avenue
 57          ID
 58          ID   "NULL" COMBINE:
 59          ID      Example: "NULL2": dummy hydrograph combine used to free up a HEC-1
 60          ID                        computational path.  Hence, hydrograph is meaningless.
 61          ID
 62          ID   ****************************************************************************
 63          ID   STREET NAME CODES
 64          ID     Thunderbird Road  = TB
 65          ID     Cactus Road       = CR
 66          ID     Peoria Avenue     = PA
 67          ID     Olive Avenue      = OA
 68          ID     Northern Avenue   = NA
 69          ID     Glendale Avenue   = GA
 70          ID     Bethany Home Road = BH
 71          ID     Camelback Road    = CB
 72          ID     Indian School Road= IS
 73          ID     Thomas Road       = TR
 74          ID     McDowell Road     = MD
 75          ID   ****************************************************************************
 76          ID
             *DIAGRAM
 77          IT       5                    1000
 78          IO       5
 79          IN      15
 80          JD    2.34    0.01
 81          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 82          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 83          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 84          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 85          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 86          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 87          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 88          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 89          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 90          PC    .983    .986    .989    .992    .995    .998   1.000
 91          JD    2.20   10.00
 92          JD    2.11   30.00
 93          JD    2.01   60.00
 94          JD    1.98   90.00
 95          JD    1.95  120.00
 96          JD    1.93  150.00
 97          JD    1.87  300.00
             *
             *   Thunderbird Road Computation Path
             *
```

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME O MAX STA
+	ROUTED TO	R51H	123.	13.75	54.	18.	6.	8.07		
+	HYDROGRAPH AT	D922W	180.	13.50	69.	20.	7.	10.10		
+	2 COMBINED AT	C51D	296.	13.58	123.	38.	13.	10.10		
+	DIVERSION TO	S51EW	174.	13.58	60.	15.	5.	10.10		
+	HYDROGRAPH AT	S51ES	122.	13.58	63.	23.	8.	10.10		
+	ROUTED TO	R51I	120.	13.83	63.	23.	8.	10.10		
+	ROUTED TO	RES91	114.	14.08	57.	17.	6.	10.10		
+	2 COMBINED AT	CBH51	221.	13.92	97.	30.	10.	10.10		
	DIVERSION TO									

+		D51BH	221.	13.92	97.	30.	10.	10.10
+	HYDROGRAPH AT	DBH51	0.	0.00	0.	0.	0.	10.10
+	HYDROGRAPH AT	S51EW	174.	13.58	60.	15.	5.	10.10
+	ROUTED TO	R822EW	170.	13.92	60.	15.	5.	10.10
+	HYDROGRAPH AT	D822ES	175.	12.25	68.	21.	7.	12.60
+	2 COMBINED AT	C822E1	261.	13.83	125.	36.	12.	14.60
+	ROUTED TO	RES8	127.	15.17	89.	29.	11.	14.60
+	ROUTED TO	R822WW	127.	15.42	89.	29.	11.	14.60
+	HYDROGRAPH AT	D51BH	221.	13.92	97.	30.	10.	10.10
+	ROUTED TO	RGR4	220.	14.08	97.	30.	10.	10.10
+	HYDROGRAPH AT	SBH2S	296.	13.50	107.	31.	10.	10.10
+	ROUTED TO	R1622S	294.	13.67	107.	31.	10.	10.10
+	HYDROGRAPH AT	16-22E	155.	12.58	49.	16.	5.	0.51
+	HYDROGRAPH AT	S43EW	8.	13.08	1.	0.	0.	6.67
+	ROUTED TO	R1622W	4.	13.67	1.	0.	0.	6.67
+	4 COMBINED AT	C1622E	530.	13.83	243.	75.	25.	11.60
+	ROUTED TO	RGR5	529.	13.92	243.	75.	25.	11.60
+	3 COMBINED AT	CCB43	689.	13.83	341.	109.	37.	11.60
+	DIVERSION TO	D43CB	689.	13.83	341.	109.	37.	11.60
+	HYDROGRAPH AT	DCB43	0.	0.00	0.	0.	0.	11.60
+	HYDROGRAPH AT	D43CB	689.	13.83	341.	109.	37.	11.60
+	DIVERSION TO	SD43AS	165.	12.58	151.	61.	21.	11.60
+	HYDROGRAPH AT	SD43A	524.	13.83	190.	48.	16.	11.60
+	ROUTED TO	RGR6	522.	14.00	190.	48.	16.	11.60

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN 09 1992              *
 *           VERSION 4.0.3E             *
 *                                      *
 *  RUN DATE  12/29/00  TIME  14:05:24  *
 *                                      *
 ****************************************
```

```
*****************************
*
*    U.S. ARMY CORPS OF ENGINE
*    HYDROLOGIC ENGINEERING CE
*          609 SECOND STREET
*       DAVIS, CALIFORNIA 9561
*          (916) 551-1748
*
*****************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTU
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   MBJ modified in July, 2000
  2           ID   MV2410yt.dat
  3           ID   RETENTION BASINS ADDED IN SUBBASIN 9-22 AND 16-22E
  4           ID   10Yr-24Hr Event
  5           ID   ****************************************************************************
  6           ID   MARYVALE ADMS - FCD#93-29: CH2M HILL & Wood/Patel & Associates
  7           ID   Model for Entire Study Area (Approximately 100 square miles)
  8           ID   Existing Conditions
  9           ID   100Yr-24Hr Event
 10           ID   Clark Unit Hydrograph
 11           ID   24-Hour SCS TYPE II Rainfall Pattern was used to determine TC & R
 12           ID   Green-Ampt Precipitation Losses
 13           ID   Model Prepared and Checked by David Dust and Jim Geisbush
 14           ID   MV100-24 (BASE79): SWW\132586\HEC-1
 15           ID   January 1997
 16           ID  ****************************************************************************
 17           ID   HEC-1 ELEMENT NOMENCLATURE
 18           ID   SUB-BASIN HYDROGRAPH:
 19           ID      Example: "17-32N": the sub-basin is Section 17, T3N, R2E
 20           ID
 21           ID   SUB-BASIN DIVERSION:
 22           ID      Example: "D1732S": is the southerly component of divert in Section 17
 23           ID
 24           ID   SUB-BASIN ROUTE:
 25           ID      Example: "R1732S": is the southerly flow route through Sec. 17, T3N, R2E
 26           ID
 27           ID   SUB-BASIN RESERVOIR ROUTE OR SURGE BASIN DIVERT:
 28           ID      Example: "RES17": corresponds to a reservoir route or surge basin divert
 29           ID                        in Sub-basin 17-##
 30           ID
 31           ID   RETENTION BASIN DIVERT:
 32           ID      Example: "RET17": corresponds to retention basin divert in
 33           ID                        Sub-Basin 17-##
 34           ID
 35           ID   SUB-BASIN COMBINE:
 36           ID      Example: "C17-32": corresponds to sub-basin combine in Sec. 17, T3N, R2E
 37           ID
 38           ID   STREET ROUTE:
 39           ID      Example: "RPA1": first route for Peoria Avenue
 40           ID      Example" "R67C": third route for 67th Avenue
 41           ID
 42           ID   STREET CAPACITY DIVERSION:
 43           ID      Example: "SPA1S": first diversion from Peoria Avenue to the south
 44           ID
 45           ID   STREET INTERSECTION DIVERSION:
 46           ID      Example: "RPA67": flow component along Peoria Avenue from diversion at
 47           ID                        Peoria Avenue and 67th Avenue
 48           ID      Example: "R67PA": flow component along 67th Avenue from diversion at
 49           ID                        Peoria Avenue and 67th Avenue
 50           ID
```

```
 51          ID   STREET INTERSECTION COMBINE:
 52          ID      Example: "CPA67": hydrograph combine at the intersection of Peoria Avenue
 53          ID                        and 67th Avenue
 54          ID
 55          ID   STREET COMBINE:

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 56          ID      Example: "CPA2": second hydrograph combine along Peoria Avenue
 57          ID
 58          ID   "NULL" COMBINE:
 59          ID      Example: "NULL2": dummy hydrograph combine used to free up a HEC-1
 60          ID                        computational path.  Hence, hydrograph is meaningless.
 61          ID
 62          ID   ******************************************************************************
 63          ID   STREET NAME CODES
 64          ID     Thunderbird Road  = TB
 65          ID     Cactus Road       = CR
 66          ID     Peoria Avenue     = PA
 67          ID     Olive Avenue      = OA
 68          ID     Northern Avenue   = NA
 69          ID     Glendale Avenue   = GA
 70          ID     Bethany Home Road = BH
 71          ID     Camelback Road    = CB
 72          ID     Indian School Road= IS
 73          ID     Thomas Road       = TR
 74          ID     McDowell Road     = MD
 75          ID   ******************************************************************************
 76          ID
             *DIAGRAM
 77          IT       5                    1000
 78          IO       5
 79          IN      15
 80          JD    2.34    0.01
 81          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 82          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 83          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 84          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 85          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 86          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 87          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 88          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 89          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 90          PC    .983    .986    .989    .992    .995    .998   1.000
 91          JD    2.20   10.00
 92          JD    2.11   30.00
 93          JD    2.01   60.00
 94          JD    1.98   90.00
 95          JD    1.95  120.00
 96          JD    1.93  150.00
 97          JD    1.87  300.00
             *
             *   Thunderbird Road Computation Path
             *
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME O MAX STA
+	ROUTED TO	R51H	123.	13.75	54.	18.	6.	8.07		
+	HYDROGRAPH AT	D922W	180.	13.50	69.	20.	7.	10.10		
+	2 COMBINED AT	C51D	296.	13.58	123.	38.	13.	10.10		
+	DIVERSION TO	S51EW	168.	13.58	59.	15.	5.	10.10		
+	HYDROGRAPH AT	S51ES	127.	13.58	64.	24.	8.	10.10		
+	ROUTED TO	R51I	126.	13.83	64.	24.	8.	10.10		
+	HYDROGRAPH AT	9-22	9.	12.00	1.	0.	0.	0.01		
+	2 COMBINED AT	CBG51	126.	13.83	65.	24.	8.	10.10		
+	ROUTED TO	RES92	87.	14.58	42.	16.	5.	10.10		

+	2 COMBINED AT	CBH51	157.	14.50	80.	28.	9.	10.10
+	DIVERSION TO	D51BH	157.	14.50	80.	28.	9.	10.10
+	HYDROGRAPH AT	DBH51	0.	0.00	0.	0.	0.	10.10
+	HYDROGRAPH AT	S51EW	168.	13.58	59.	15.	5.	10.10
+	ROUTED TO	R822EW	165.	13.92	59.	15.	5.	10.10
+	HYDROGRAPH AT	D822ES	173.	12.25	68.	21.	7.	12.60
+	2 COMBINED AT	C822E1	256.	13.83	124.	35.	12.	14.60
+	ROUTED TO	RES8	80.	15.67	39.	11.	4.	14.60
+	ROUTED TO	R822WW	79.	16.00	38.	11.	4.	14.60
+	HYDROGRAPH AT	D51BH	157.	14.50	80.	28.	9.	10.10
+	ROUTED TO	RGR4	156.	14.75	80.	28.	9.	10.10
+	HYDROGRAPH AT	SBH2S	296.	13.50	107.	31.	10.	10.10
+	ROUTED TO	R1622S	294.	13.67	107.	31.	10.	10.10
+	HYDROGRAPH AT	16-22E	155.	12.58	49.	16.	5.	0.51
+	HYDROGRAPH AT	S43EW	8.	13.08	1.	0.	0.	6.67
+	ROUTED TO	R1622W	4.	13.67	1.	0.	0.	6.67
+	4 COMBINED AT	C1622E	446.	13.67	226.	72.	25.	11.60
+	ROUTED TO	RES16B	289.	15.00	129.	47.	16.	11.60
+	ROUTED TO	RGR5	288.	15.17	128.	47.	16.	11.60
+	3 COMBINED AT	CCB43	399.	15.17	213.	77.	27.	11.60
+	DIVERSION TO	D43CB	399.	15.17	213.	77.	27.	11.60
+	HYDROGRAPH AT	DCB43	0.	0.00	0.	0.	0.	11.60
+	HYDROGRAPH AT	D43CB	399.	15.17	213.	77.	27.	11.60
+	ROUTED TO	RES22B	398.	15.17	212.	76.	26.	11.60
+	DIVERSION TO	SD43AS	165.	13.08	148.	60.	20.	11.60
+	HYDROGRAPH AT	SD43A	233.	15.17	64.	16.	5.	11.60
+	ROUTED TO	RGR6	231.	15.33	64.	16.	5.	11.60

```
1****************************************                                    ******************************
 *                                      *                                    *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINE
 *             JUN 09 1992              *                                    *    HYDROLOGIC ENGINEERING CE
 *           VERSION 4.0.3E             *                                    *         609 SECOND STREET
 *                                      *                                    *       DAVIS, CALIFORNIA 9561
 *  RUN DATE  12/29/00  TIME  14:15:41  *                                    *           (916) 551-1748
 *                                      *                                    *
 ****************************************                                    ******************************

                                        X     X  XXXXXXX   XXXXX           X
                                        X     X  X        X     X         XX
                                        X     X  X        X                X
                                        XXXXXXX  XXXX     X        XXXXX   X
                                        X     X  X        X                X
                                        X     X  X        X     X          X
                                        X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTU
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   MBJ modified in July, 2000
  2           ID   MV2450yf.dat
  3           ID   Existing Condition
  4           ID   50Yr-24Hr Event
  5           ID   ******************************************************************************
  6           ID   MARYVALE ADMS - FCD#93-29: CH2M HILL & Wood/Patel & Associates
  7           ID   Model for Entire Study Area (Approximately 100 square miles)
  8           ID   Existing Conditions
  9           ID   100Yr-24Hr Event
 10           ID   Clark Unit Hydrograph
 11           ID   24-Hour SCS TYPE II Rainfall Pattern was used to determine TC & R
 12           ID   Green-Ampt Precipitation Losses
 13           ID   Model Prepared and Checked by David Dust and Jim Geisbush
 14           ID   MV100-24 (BASE79): SWW\132586\HEC-1
 15           ID   January 1997
 16           ID  ********************************************************************************
 17           ID   HEC-1 ELEMENT NOMENCLATURE
 18           ID   SUB-BASIN HYDROGRAPH:
 19           ID      Example: "17-32N": the sub-basin is Section 17, T3N, R2E
 20           ID
 21           ID   SUB-BASIN DIVERSION:
 22           ID      Example: "D1732S": is the southerly component of divert in Section 17
 23           ID
 24           ID   SUB-BASIN ROUTE:
 25           ID      Example: "R1732S": is the southerly flow route through Sec. 17, T3N, R2E
 26           ID
 27           ID   SUB-BASIN RESERVOIR ROUTE OR SURGE BASIN DIVERT:
 28           ID      Example: "RES17": corresponds to a reservoir route or surge basin divert
 29           ID                        in Sub-basin 17-##
 30           ID
 31           ID   RETENTION BASIN DIVERT:
 32           ID      Example: "RET17": corresponds to retention basin divert in
 33           ID                        Sub-Basin 17-##
 34           ID
 35           ID   SUB-BASIN COMBINE:
 36           ID      Example: "C17-32": corresponds to sub-basin combine in Sec. 17, T3N, R2E
 37           ID
 38           ID   STREET ROUTE:
 39           ID      Example: "RPA1": first route for Peoria Avenue
 40           ID      Example" "R67C": third route for 67th Avenue
 41           ID
 42           ID   STREET CAPACITY DIVERSION:
 43           ID      Example: "SPA1S": first diversion from Peoria Avenue to the south
 44           ID
 45           ID   STREET INTERSECTION DIVERSION:
 46           ID      Example: "RPA67": flow component along Peoria Avenue from diversion at
 47           ID                        Peoria Avenue and 67th Avenue
 48           ID      Example: "R67PA": flow component along 67th Avenue from diversion at
 49           ID                        Peoria Avenue and 67th Avenue
 50           ID
```

```
 51          ID   STREET INTERSECTION COMBINE:
 52          ID      Example: "CPA67": hydrograph combine at the intersection of Peoria Avenue
 53          ID                        and 67th Avenue
 54          ID
 55          ID   STREET COMBINE:
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 56          ID      Example: "CPA2": second hydrograph combine along Peoria Avenue
 57          ID
 58          ID   "NULL" COMBINE:
 59          ID      Example: "NULL2": dummy hydrograph combine used to free up a HEC-1
 60          ID                        computational path.  Hence, hydrograph is meaningless.
 61          ID
 62          ID   ***************************************************************************
 63          ID   STREET NAME CODES
 64          ID     Thunderbird Road  = TB
 65          ID     Cactus Road       = CR
 66          ID     Peoria Avenue     = PA
 67          ID     Olive Avenue      = OA
 68          ID     Northern Avenue   = NA
 69          ID     Glendale Avenue   = GA
 70          ID     Bethany Home Road = BH
 71          ID     Camelback Road    = CB
 72          ID     Indian School Road= IS
 73          ID     Thomas Road       = TR
 74          ID     McDowell Road     = MD
 75          ID   ***************************************************************************
 76          ID
             *DIAGRAM
 77          IT       5                    1000
 78          IO       5
 79          IN      15
 80          JD    3.28    0.01
 81          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 82          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 83          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 84          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 85          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 86          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 87          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 88          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 89          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 90          PC    .983    .986    .989    .992    .995    .998   1.000
 91          JD    3.08   10.00
 92          JD    2.95   30.00
 93          JD    2.82   60.00
 94          JD    2.77   90.00
 95          JD    2.74  120.00
 96          JD    2.70  150.00
 97          JD    2.62  300.00
             *
             *   Thunderbird Road Computation Path
```

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME O MAX STA
+	ROUTED TO	R51H	226.	13.50	87.	28.	9.	8.07		
+	HYDROGRAPH AT	D922W	355.	13.33	120.	35.	12.	10.10		
+	2 COMBINED AT	C51D	566.	13.42	206.	62.	21.	10.10		
+	DIVERSION TO	S51EW	346.	13.42	113.	28.	9.	10.10		
+	HYDROGRAPH AT	S51ES	220.	13.42	93.	34.	11.	10.10		
+	ROUTED TO	R51I	218.	13.50	93.	34.	11.	10.10		
+	ROUTED TO	RES91	204.	13.75	92.	28.	9.	10.10		
+	2 COMBINED AT	CBH51	410.	13.58	166.	49.	17.	10.10		
	DIVERSION TO									

+		D51BH	410.	13.58	166.	49.	17.	10.10
+	HYDROGRAPH AT	DBH51	0.	0.00	0.	0.	0.	10.10
+	HYDROGRAPH AT	S51EW	346.	13.42	113.	28.	9.	10.10
+	ROUTED TO	R822EW	342.	13.58	113.	28.	9.	10.10
+	HYDROGRAPH AT	D822ES	269.	12.25	113.	35.	12.	12.60
+	2 COMBINED AT	C822E1	522.	13.58	222.	62.	21.	14.60
+	ROUTED TO	RES8	286.	14.67	175.	55.	19.	14.60
+	ROUTED TO	R822WW	285.	14.83	175.	55.	19.	14.60
+	HYDROGRAPH AT	D51BH	410.	13.58	166.	49.	17.	10.10
+	ROUTED TO	RGR4	407.	13.83	165.	49.	17.	10.10
+	HYDROGRAPH AT	SBH2S	577.	13.33	188.	53.	18.	10.10
+	ROUTED TO	R1622S	574.	13.42	188.	53.	18.	10.10
+	HYDROGRAPH AT	16-22E	246.	12.58	76.	24.	8.	0.51
+	HYDROGRAPH AT	S43EW	73.	13.00	12.	3.	1.	6.67
+	ROUTED TO	R1622W	68.	13.33	12.	3.	1.	6.67
+	4 COMBINED AT	C1622E	1087.	13.50	428.	127.	43.	11.60
+	ROUTED TO	RGR5	1083.	13.67	427.	127.	43.	11.60
+	3 COMBINED AT	CCB43	1311.	13.58	555.	171.	58.	11.60
+	DIVERSION TO	D43CB	1311.	13.58	555.	171.	58.	11.60
+	HYDROGRAPH AT	DCB43	0.	0.00	0.	0.	0.	11.60
+	HYDROGRAPH AT	D43CB	1311.	13.58	555.	171.	58.	11.60
+	DIVERSION TO	SD43AS	165.	12.33	160.	72.	25.	11.60
+	HYDROGRAPH AT	SD43A	1146.	13.58	395.	99.	33.	11.60
+	ROUTED TO	RGR6	1144.	13.67	395.	99.	33.	11.60

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN 09 1992              *
 *           VERSION 4.0.3E             *
 *                                      *
 *  RUN DATE  12/29/00  TIME  13:56:25  *
 *                                      *
 ****************************************
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****************************
*                          *
*   U.S. ARMY CORPS OF ENGINE
*   HYDROLOGIC ENGINEERING CE
*         609 SECOND STREET
*      DAVIS, CALIFORNIA 9561
*          (916) 551-1748
*                          *
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```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTU
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   MBJ modified in July, 2000
   2          ID   MV2450yt.dat
   3          ID   RETENTION BASINS ADDED IN SUBBASIN 9-22 AND 16-22E
   4          ID   50Yr-24Hr Event
   5          ID   ****************************************************************************
   6          ID   MARYVALE ADMS - FCD#93-29: CH2M HILL & Wood/Patel & Associates
   7          ID   Model for Entire Study Area (Approximately 100 square miles)
   8          ID   Existing Conditions
   9          ID   100Yr-24Hr Event
  10          ID   Clark Unit Hydrograph
  11          ID   24-Hour SCS TYPE II Rainfall Pattern was used to determine TC & R
  12          ID   Green-Ampt Precipitation Losses
  13          ID   Model Prepared and Checked by David Dust and Jim Geisbush
  14          ID   MV100-24 (BASE79): SWW\132586\HEC-1
  15          ID   January 1997
  16          ID  ******************************************************************************
  17          ID   HEC-1 ELEMENT NOMENCLATURE
  18          ID   SUB-BASIN HYDROGRAPH:
  19          ID      Example: "17-32N": the sub-basin is Section 17, T3N, R2E
  20          ID
  21          ID   SUB-BASIN DIVERSION:
  22          ID      Example: "D1732S": is the southerly component of divert in Section 17
  23          ID
  24          ID   SUB-BASIN ROUTE:
  25          ID      Example: "R1732S": is the southerly flow route through Sec. 17, T3N, R2E
  26          ID
  27          ID   SUB-BASIN RESERVOIR ROUTE OR SURGE BASIN DIVERT:
  28          ID      Example: "RES17": corresponds to a reservoir route or surge basin divert
  29          ID                        in Sub-basin 17-##
  30          ID
  31          ID   RETENTION BASIN DIVERT:
  32          ID      Example: "RET17": corresponds to retention basin divert in
  33          ID                        Sub-Basin 17-##
  34          ID
  35          ID   SUB-BASIN COMBINE:
  36          ID      Example: "C17-32": corresponds to sub-basin combine in Sec. 17, T3N, R2E
  37          ID
  38          ID   STREET ROUTE:
  39          ID      Example: "RPA1": first route for Peoria Avenue
  40          ID      Example" "R67C": third route for 67th Avenue
  41          ID
  42          ID   STREET CAPACITY DIVERSION:
  43          ID      Example: "SPA1S": first diversion from Peoria Avenue to the south
  44          ID
  45          ID   STREET INTERSECTION DIVERSION:
  46          ID      Example: "RPA67": flow component along Peoria Avenue from diversion at
  47          ID                        Peoria Avenue and 67th Avenue
  48          ID      Example: "R67PA": flow component along 67th Aver.ue from diversion at
  49          ID                        Peoria Avenue and 67th Avenue
  50          ID
```

```
 51          ID   STREET INTERSECTION COMBINE:
 52          ID      Example: "CPA67": hydrograph combine at the intersection of Peoria Avenue
 53          ID                        and 67th Avenue
 54          ID
 55          ID   STREET COMBINE:
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 56          ID      Example: "CPA2": second hydrograph combine along Peoria Avenue
 57          ID
 58          ID   "NULL" COMBINE:
 59          ID      Example: "NULL2": dummy hydrograph combine used to free up a HEC-1
 60          ID                        computational path.  Hence, hydrograph is meaningless.
 61          ID
 62          ID   ****************************************************************************
 63          ID   STREET NAME CODES
 64          ID     Thunderbird Road  = TB
 65          ID     Cactus Road       = CR
 66          ID     Peoria Avenue     = PA
 67          ID     Olive Avenue      = OA
 68          ID     Northern Avenue   = NA
 69          ID     Glendale Avenue   = GA
 70          ID     Bethany Home Road = BH
 71          ID     Camelback Road    = CB
 72          ID     Indian School Road= IS
 73          ID     Thomas Road       = TR
 74          ID     McDowell Road     = MD
 75          ID   ****************************************************************************
 76          ID
             *DIAGRAM
 77          IT       5                    1000
 78          IO       5
 79          IN      15
 80          JD    3.28    0.01
 81          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 82          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 83          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 84          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 85          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 86          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 87          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 88          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 89          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 90          PC    .983    .986    .989    .992    .995    .998   1.000
 91          JD    3.08   10.00
 92          JD    2.95   30.00
 93          JD    2.82   60.00
 94          JD    2.77   90.00
 95          JD    2.74  120.00
 96          JD    2.70  150.00
 97          JD    2.62  300.00
             *
             *   Thunderbird Road Computation Path
             *
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME O MAX STA
+	ROUTED TO	R51H	226.	13.50	87.	28.	9.	8.07		
+	HYDROGRAPH AT	D922W	355.	13.33	120.	35.	12.	10.10		
+	2 COMBINED AT	C51D	566.	13.42	206.	62.	21.	10.10		
+	DIVERSION TO	S51EW	331.	13.42	109.	27.	9.	10.10		
+	HYDROGRAPH AT	S51ES	235.	13.42	97.	35.	12.	10.10		
+	ROUTED TO	R51I	232.	13.50	97.	35.	12.	10.10		
+	HYDROGRAPH AT	9-22	13.	12.00	1.	0.	0.	0.01		
+	2 COMBINED AT	CBG51	233.	13.50	98.	35.	12.	10.10		
	ROUTED TO									

+		RES92	203.	13.92	81.	27.	9.	10.10
+	2 COMBINED AT	CBH51	392.	13.75	152.	48.	16.	10.10
+	DIVERSION TO	D51BH	392.	13.75	152.	48.	16.	10.10
+	HYDROGRAPH AT	DBH51	0.	0.00	0.	0.	0.	10.10
+	HYDROGRAPH AT	S51EW	331.	13.42	109.	27.	9.	10.10
+	ROUTED TO	R822EW	328.	13.58	109.	27.	9.	10.10
+	HYDROGRAPH AT	D822ES	266.	12.25	113.	35.	12.	12.60
+	2 COMBINED AT	C822E1	507.	13.58	218.	61.	20.	14.60
+	ROUTED TO	RES8	265.	14.75	136.	37.	12.	14.60
+	ROUTED TO	R822WW	264.	14.92	135.	37.	12.	14.60
+	HYDROGRAPH AT	D51BH	392.	13.75	152.	48.	16.	10.10
+	ROUTED TO	RGR4	389.	13.92	152.	48.	16.	10.10
+	HYDROGRAPH AT	SBH2S	577.	13.33	188.	53.	18.	10.10
+	ROUTED TO	R1622S	574.	13.42	188.	53.	18.	10.10
+	HYDROGRAPH AT	16-22E	246.	12.58	76.	24.	8.	0.51
+	HYDROGRAPH AT	S43EW	73.	13.00	12.	3.	1.	6.67
+	ROUTED TO	R1622W	68.	13.33	12.	3.	1.	6.67
+	4 COMBINED AT	C1622E	991.	13.67	414.	125.	42.	11.60
+	ROUTED TO	RES16B	961.	13.83	324.	99.	33.	11.60
+	ROUTED TO	RGR5	955.	14.00	322.	99.	33.	11.60
+	3 COMBINED AT	CCB43	1160.	13.92	437.	140.	48.	11.60
+	DIVERSION TO	D43CB	1160.	13.92	437.	140.	48.	11.60
+	HYDROGRAPH AT	DCB43	0.	0.00	0.	0.	0.	11.60
+	HYDROGRAPH AT	D43CB	1160.	13.92	437.	140.	48.	11.60
+	ROUTED TO	RES22B	1160.	13.92	436.	139.	47.	11.60
+	DIVERSION TO	SD43AS	165.	12.75	160.	70.	24.	11.60
+	HYDROGRAPH AT	SD43A	995.	13.92	276.	69.	23.	11.60
+	ROUTED TO	RGR6	986.	14.00	276.	69.	23.	11.60

```
1****************************************                                    ******************************
 *                                      *                                    *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINE
 *             JUN 09 1992              *                                    *    HYDROLOGIC ENGINEERING CE
 *            VERSION 4.0.3E            *                                    *          609 SECOND STREET
 *                                      *                                    *       DAVIS, CALIFORNIA 9561
 *  RUN DATE  12/29/00  TIME  10:34:41  *                                    *           (916) 551-1748
 *                                      *                                    *
 ****************************************                                    ******************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTU
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   MARYVALE ADMS - FCD#93-29: CH2M HILL & Wood/Patel & Associates
   2          ID   Model for Entire Study Area (Approximately 100 square miles)
   3          ID   Existing Conditions
   4          ID   100Yr-24Hr Event
   5          ID   Clark Unit Hydrograph
   6          ID   24-Hour SCS TYPE II Rainfall Pattern was used to determine TC & R
   7          ID   Green-Ampt Precipitation Losses
   8          ID   Model Prepared and Checked by David Dust and Jim Geisbush
   9          ID   MV100-24 (BASE79): SWW\132586\HEC-1
  10          ID   January 1997
  11          ID  ******************************************************************************
  12          ID   HEC-1 ELEMENT NOMENCLATURE
  13          ID   SUB-BASIN HYDROGRAPH:
  14          ID      Example: "17-32N": the sub-basin is Section 17, T3N, R2E
  15          ID
  16          ID   SUB-BASIN DIVERSION:
  17          ID      Example: "D1732S": is the southerly component of divert in Section 17
  18          ID
  19          ID   SUB-BASIN ROUTE:
  20          ID      Example: "R1732S": is the southerly flow route through Sec. 17, T3N, R2E
  21          ID
  22          ID   SUB-BASIN RESERVOIR ROUTE OR SURGE BASIN DIVERT:
  23          ID      Example: "RES17": corresponds to a reservoir route or surge basin divert
  24          ID                        in Sub-basin 17-##
  25          ID
  26          ID   RETENTION BASIN DIVERT:
  27          ID      Example: "RET17": corresponds to retention basin divert in
  28          ID                        Sub-Basin 17-##
  29          ID
  30          ID   SUB-BASIN COMBINE:
  31          ID      Example: "C17-32": corresponds to sub-basin combine in Sec. 17, T3N, R2E
  32          ID
  33          ID   STREET ROUTE:
  34          ID      Example: "RPA1": first route for Peoria Avenue
  35          ID      Example" "R67C": third route for 67th Avenue
  36          ID
  37          ID   STREET CAPACITY DIVERSION:
  38          ID      Example: "SPA1S": first diversion from Peoria Avenue to the south
  39          ID
  40          ID   STREET INTERSECTION DIVERSION:
  41          ID      Example: "RPA67": flow component along Peoria Avenue from diversion at
  42          ID                        Peoria Avenue and 67th Avenue
  43          ID      Example: "R67PA": flow component along 67th Avenue from diversion at
  44          ID                        Peoria Avenue and 67th Avenue
  45          ID
  46          ID   STREET INTERSECTION COMBINE:
  47          ID      Example: "CPA67": hydrograph combine at the intersection of Peoria Avenue
  48          ID                        and 67th Avenue
  49          ID
  50          ID   STREET COMBINE:
```

```
 51          ID      Example: "CPA2": second hydrograph combine along Peoria Avenue
 52          ID
 53          ID   "NULL" COMBINE:
 54          ID      Example: "NULL2": dummy hydrograph combine used to free up a HEC-1
 55          ID                        computational path.  Hence, hydrograph is meaningless.
1                                          HEC-1 INPUT                                          PAGE  2

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 56          ID
 57          ID   ****************************************************************************
 58          ID   STREET NAME CODES
 59          ID     Thunderbird Road  = TB
 60          ID     Cactus Road       = CR
 61          ID     Peoria Avenue     = PA
 62          ID     Olive Avenue      = OA
 63          ID     Northern Avenue   = NA
 64          ID     Glendale Avenue   = GA
 65          ID     Bethany Home Road = BH
 66          ID     Camelback Road    = CB
 67          ID     Indian School Road= IS
 68          ID     Thomas Road       = TR
 69          ID     McDowell Road     = MD
 70          ID   ****************************************************************************
 71          ID
             *DIAGRAM
 72          IT       5                    1000
 73          IO       5
 74          IN      15
 75          JD    3.69    0.01
 76          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 77          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 78          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 79          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 80          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 81          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 82          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 83          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 84          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 85          PC    .983    .986    .989    .992    .995    .998   1.000
 86          JD    3.47   10.00
 87          JD    3.32   30.00
 88          JD    3.17   60.00
 89          JD    3.12   90.00
 90          JD    3.08  120.00
 91          JD    3.04  150.00
 92          JD    2.95  300.00
 93          JD    2.88  500.00
             *
             *   Thunderbird Road Computation Path
1
                                        RUNOFF SUMMARY
                                   FLOW IN CUBIC FEET PER SECOND
                                 TIME IN HOURS,  AREA IN SQUARE MILES

                                 PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME O
      OPERATION        STATION   FLOW     PEAK                                           AREA      STAGE     MAX STA
+                                                     6-HOUR      24-HOUR      72-HOUR
                       *
      ROUTED TO
+                        R51H     275.   13.42         102.         32.          11.      8.07
      HYDROGRAPH AT
+                        D922W    435.   13.25         144.         41.          14.     10.10
      2 COMBINED AT
+                        C51D     695.   13.33         245.         73.          25.     10.10
      DIVERSION TO
+                        S51EW    428.   13.33         138.         34.          11.     10.10
      HYDROGRAPH AT
+                        S51ES    267.   13.33         107.         39.          13.     10.10
      ROUTED TO
+                        R51I     264.   13.50         107.         39.          13.     10.10
      ROUTED TO
+                        RES91    255.   13.67         107.         33.          11.     10.10
      2 COMBINED AT
+                        CBH51    508.   13.58         196.         58.          19.     10.10
      DIVERSION TO
+                        D51BH    508.   13.58         196.         58.          19.     10.10
      HYDROGRAPH AT
+                        DBH51      0.    0.00           0.          0.           0.     10.10
```

+	HYDROGRAPH AT S51EW	428.	13.33	138.	34.	11.	10.10
+	ROUTED TO R822EW	421.	13.50	138.	34.	11.	10.10
+	HYDROGRAPH AT D822ES	312.	12.25	135.	41.	14.	12.60
+	2 COMBINED AT C822E1	649.	13.50	266.	74.	25.	14.60
+	ROUTED TO RES8	369.	14.50	217.	67.	23.	14.60
+	ROUTED TO R822WW	368.	14.67	217.	67.	23.	14.60
+	HYDROGRAPH AT D51BH	508.	13.58	196.	58.	19.	10.10
+	ROUTED TO RGR4	504.	13.75	196.	58.	19.	10.10
+	HYDROGRAPH AT SBH2S	705.	13.25	226.	63.	21.	10.10
+	ROUTED TO R1622S	703.	13.33	226.	63.	21.	10.10
+	HYDROGRAPH AT 16-22E	287.	12.58	89.	28.	9.	0.51
+	HYDROGRAPH AT S43EW	100.	13.00	18.	4.	1.	6.67
+	ROUTED TO R1622W	97.	13.25	18.	4.	1.	6.67
+	4 COMBINED AT C1622E	1345.	13.50	514.	151.	51.	11.60
+	ROUTED TO RGR5	1343.	13.58	514.	151.	51.	11.60
+	3 COMBINED AT CCB43	1594.	13.50	653.	200.	67.	11.60
+	DIVERSION TO D43CB	1594.	13.50	653.	200.	67.	11.60
+	HYDROGRAPH AT DCB43	0.	0.00	0.	0.	0.	11.60
+	HYDROGRAPH AT D43CB	1594.	13.50	653.	200.	67.	11.60
+	DIVERSION TO SD43AS	165.	12.25	162.	77.	26.	11.60
+	HYDROGRAPH AT SD43A	1429.	13.50	491.	123.	41.	11.60
+	ROUTED TO RGR6	1427.	13.58	491.	123.	41.	11.60

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             JUN 09 1992               *
 *            VERSION 4.0.3E             *
 *                                       *
 *  RUN DATE  12/29/00  TIME  13:21:10   *
 *                                       *
 *****************************************
```

```
*****************************
*                           *
*   U.S. ARMY CORPS OF ENGINE
*   HYDROLOGIC ENGINEERING CE
*         609 SECOND STREET
*      DAVIS, CALIFORNIA 9561
*          (916) 551-1748
*                           *
*****************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTU
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID   MBJ modified in July, 2000
   2          ID   MV2400yt.dat
   3          ID   RETENTION BASINS ADDED IN SUBBASIN 9-22 AND 16-22E
   4          ID   100Yr-24Hr Event
   5          ID   ****************************************************************************
   6          ID   MARYVALE ADMS - FCD#93-29: CH2M HILL & Wood/Patel & Associates
   7          ID   Model for Entire Study Area (Approximately 100 square miles)
   8          ID   Existing Conditions
   9          ID   100Yr-24Hr Event
  10          ID   Clark Unit Hydrograph
  11          ID   24-Hour SCS TYPE II Rainfall Pattern was used to determine TC & R
  12          ID   Green-Ampt Precipitation Losses
  13          ID   Model Prepared and Checked by David Dust and Jim Geisbush
  14          ID   MV100-24 (BASE79): SWW\132586\HEC-1
  15          ID   January 1997
  16          ID  ****************************************************************************
  17          ID   HEC-1 ELEMENT NOMENCLATURE
  18          ID   SUB-BASIN HYDROGRAPH:
  19          ID      Example: "17-32N": the sub-basin is Section 17, T3N, R2E
  20          ID
  21          ID   SUB-BASIN DIVERSION:
  22          ID      Example: "D1732S": is the southerly component of divert in Section 17
  23          ID
  24          ID   SUB-BASIN ROUTE:
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  26          ID
  27          ID   SUB-BASIN RESERVOIR ROUTE OR SURGE BASIN DIVERT:
  28          ID      Example: "RES17": corresponds to a reservoir route or surge basin divert
  29          ID                        in Sub-basin 17-##
  30          ID
  31          ID   RETENTION BASIN DIVERT:
  32          ID      Example: "RET17": corresponds to retention basin divert in
  33          ID                        Sub-Basin 17-##
  34          ID
  35          ID   SUB-BASIN COMBINE:
  36          ID      Example: "C17-32": corresponds to sub-basin combine in Sec. 17, T3N, R2E
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  45          ID   STREET INTERSECTION DIVERSION:
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  47          ID                        Peoria Avenue and 67th Avenue
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  50          ID
```

```
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 52          ID      Example: "CPA67": hydrograph combine at the intersection of Peoria Avenue
 53          ID                        and 67th Avenue
 54          ID
 55          ID   STREET COMBINE:
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

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 57          ID
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 64          ID     Thunderbird Road  = TB
 65          ID     Cactus Road       = CR
 66          ID     Peoria Avenue     = PA
 67          ID     Olive Avenue      = OA
 68          ID     Northern Avenue   = NA
 69          ID     Glendale Avenue   = GA
 70          ID     Bethany Home Road = BH
 71          ID     Camelback Road    = CB
 72          ID     Indian School Road= IS
 73          ID     Thomas Road       = TR
 74          ID     McDowell Road     = MD
 75          ID   ***************************************************************************
 76          ID
             *DIAGRAM
 77          IT       5                    400
 78          IO       5
 79          IN      15
 80          JD    3.69    0.01
 81          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 82          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 83          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 84          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 85          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 86          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 87          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 88          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 89          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 90          PC    .983    .986    .989    .992    .995    .998   1.000
 91          JD    3.47   10.00
 92          JD    3.32   30.00
 93          JD    3.17   60.00
 94          JD    3.12   90.00
 95          JD    3.08  120.00
 96          JD    3.04  150.00
 97          JD    2.95  300.00
 98          JD    2.88  500.00
             *
             *   Thunderbird Road Computation Path
```

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME O MAX STA
+		*								
+		R51H	275.	13.42	102.	32.	24.	8.07		
	HYDROGRAPH AT									
+		D922W	435.	13.25	144.	41.	30.	10.10		
	2 COMBINED AT									
+		C51D	695.	13.33	245.	73.	53.	10.10		
	DIVERSION TO									
+		S51EW	409.	13.33	133.	33.	24.	10.10		
	HYDROGRAPH AT									
+		S51ES	286.	13.33	112.	40.	29.	10.10		
	ROUTED TO									
+		R51I	283.	13.50	112.	40.	29.	10.10		
	HYDROGRAPH AT									
+		9-22	15.	12.00	2.	1.	0.	0.01		
	2 COMBINED AT									
+		CBG51	283.	13.50	113.	41.	30.	10.10		
	ROUTED TO									

+	RES92	254.	13.75	99.	32.	23.	10.10
2 COMBINED AT +	CBH51	495.	13.67	185.	57.	42.	10.10
DIVERSION TO +	D51BH	495.	13.67	185.	57.	42.	10.10
HYDROGRAPH AT +	DBH51	0.	0.00	0.	0.	0.	10.10
HYDROGRAPH AT +	S51EW	409.	13.33	133.	33.	24.	10.10
ROUTED TO +	R822EW	403.	13.50	133.	33.	24.	10.10
HYDROGRAPH AT +	D822ES	309.	12.25	134.	41.	29.	12.60
2 COMBINED AT +	C822E1	631.	13.50	261.	73.	53.	14.60
ROUTED TO +	RES8	368.	14.50	181.	48.	35.	14.60
ROUTED TO +	R822WW	366.	14.67	179.	48.	35.	14.60
HYDROGRAPH AT +	D51BH	495.	13.67	185.	57.	42.	10.10
ROUTED TO +	RGR4	492.	13.83	185.	57.	42.	10.10
HYDROGRAPH AT +	SBH2S	705.	13.25	226.	63.	46.	10.10
ROUTED TO +	R1622S	703.	13.33	226.	63.	46.	10.10
HYDROGRAPH AT +	16-22E	287.	12.58	89.	28.	20.	0.51
HYDROGRAPH AT +	S43EW	100.	13.00	18.	4.	3.	6.67
ROUTED TO +	R1622W	97.	13.25	18.	4.	3.	6.67
4 COMBINED AT +	C1622E	1299.	13.58	501.	149.	109.	11.60
ROUTED TO +	RES16B	1274.	13.67	416.	122.	88.	11.60
ROUTED TO +	RGR5	1266.	13.75	413.	122.	88.	11.60
3 COMBINED AT +	CCB43	1499.	13.75	539.	168.	124.	11.60
DIVERSION TO +	D43CB	1499.	13.75	539.	168.	124.	11.60
HYDROGRAPH AT +	DCB43	0.	0.00	0.	0.	0.	11.60
HYDROGRAPH AT +	D43CB	1499.	13.75	539.	168.	124.	11.60
ROUTED TO +	RES22B	1499.	13.75	539.	167.	120.	11.60
DIVERSION TO +	SD43AS	165.	12.67	162.	73.	53.	11.60
HYDROGRAPH AT +	SD43A	1334.	13.75	377.	94.	68.	11.60
ROUTED TO +	RGR6	1334.	13.75	377.	94.	68.	11.60

APPENDIX B
Detention Basins

1. Required Retention Volume Calculations
2. Basin Capacities
4. C-Coefficient Table from FCDMC Hydrology Manual
5. Outlet Pipe Calculations

Project: Grand Avenue - 43rd Avenue / Camelback Road

Subject: Retention Calculations for 100-year, 2-hour Storm

Computed by: FT Date: 1/4/01 Checked by: CWR Date: 1/4/01

Volume, V = CpA (Per FCDMC Manual)

C =Weighted runoff coefficient: Bare Ground, C = 0.35 Area = 24 acres

Pavement, C = 0.95 Area = 23.32 acres

$$C = \frac{24(0.35) + 23.32(0.95)}{47.32}$$

C= 0.65

$p = \frac{2.63"}{12"}$, precipitation for a 100-year, 2-hour storm (ft)

A = 47.32 acres

Volume = 6.74 acre-ft

Volume, V = 7200CIA (per City of Glendale Design Manual)

I = 1.25in per hour
A = 47.32 acres
C = 0.65

Volume = 6.35 acre-ft

Project Grand Avenue Overpass at Camelback Road/43rd Avenue

Subject: Retention basin calculations

Computed By: WC **Checked By:**

Baker

File Name: hhcbup.xls

Date: December, 2000

Basin 1 (East of Grand Ave north of Camelback Rd)

Area	Area	V	Elev-P*	Q out
ft^2	acre	Acre-Feet	ft	cfs
20052	0.00	0	1127.6	0
69703	1.60	1.60	1129.6	0
80943	1.86	5.06	1131.6	0
93656	2.15	9.07	1133.6	0
105000	2.41	12.49	1135.1	0
110523	2.54	13.75	1135.6	90
110523	2.54	16.29	1136.6	1500

*Elev-P Elevation used in HEC-1 model based on NGVD 1929 Datum

Basin 2 (East of Grand Ave north of Camelback Rd)

Area	Area	V	Elev-P	Q out
ft^2	acre	Acre-Feet	ft	cfs
7279	0.00	0	1129.6	0
7700	0.18	0.18	1131.6	0
11096	0.25	0.61	1133.6	0
13500	0.31	1.03	1135.1	0
14876	0.34	1.20	1135.6	0
18000	0.41	1.57	1136.6	0
20290	0.47	2.01	1137.6	0

Basin 1+2 (East of Grand Ave north of Camelback Rd)

Area	Area	V	Elev-P	Q out
ft^2	acre	Acre-Feet	ft	cfs
20052	0.00	0	1127.7	0
76982	1.60	1.60	1129.7	0
88643	2.03	5.24	1131.7	0
104752	2.40	9.68	1133.7	0
118500	2.72	13.52	1135.2	0
125399	2.88	14.96	1135.7	90
128523	2.95	17.87	1136.7	700
148813	3.42	19.88	1137.7	2000

Basin 3 (East of Grand Ave south of Camelback Rd)

Area	Area	V	Elev-P	Q out
ft^2	acre	Acre-Feet	ft	cfs
500	0.00	0	1128.6	0
1000	0.02	0.01	1129.6	0
108196	2.48	2.52	1131.6	0
530555	12.18	17.18	1133.6	0
559232	12.84	42.20	1135.6	0
617784	14.18	96.24	1139.6	0
620000	14.23	110.45	1140.6	45
630000	14.46	124.80	1141.6	475
645000	14.81	139.43	1142.6	2500
657895	15.10	154.39	1143.6	

Table 3.2
C Coefficients for Use with the Rational Method

Land Use	Return Period			
	2-10 Year	25 Year	50 Year	100 Year
Streets and Roads				
Paved Roads	0.75 – 0.85	0.83 – 0.94	0.90 – 0.95	0.94 – 0.95
Gravel Roadways & Shoulders	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Industrial Areas				
Heavy	0.70 – 0.80	0.77 – 0.88	0.84 – 0.95	0.88 – 0.95
Light	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Business Areas				
Downtown	0.75 – 0.85	0.83 – 0.94	0.90 – 0.95	0.94 – 0.95
Neighborhood	0.55 – 0.65	0.61 – 0.72	0.66 – 0.78	0.69 – 0.81
Residential Areas				
Lawns – Flat	0.10 – 0.25	0.11 – 0.28	0.12 – 0.30	0.13 – 0.31
– Steep	0.25 – 0.40	0.28 – 0.44	0.30 – 0.48	0.31 – 0.50
Suburban	0.30 – 0.40	0.33 – 0.44	0.36 – 0.48	0.38 – 0.50
Single Family	0.45 – 0.55	0.50 – 0.61	0.54 – 0.66	0.56 – 0.69
Multi-Unit	0.50 – 0.60	0.55 – 0.66	0.60 – 0.72	0.63 – 0.75
Apartments	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Parks/Cemetaries	0.10 – 0.25	0.11 – 0.28	0.12 – 0.30	0.13 – 0.31
Playgrounds	0.40 – 0.50	0.44 – 0.55	0.48 – 0.60	0.50 – 0.63
Agricultural Areas	0.10 – 0.20	0.11 – 0.22	0.12 – 0.24	0.13 – 0.25
Bare Ground	0.20 – 0.30	0.22 – 0.33	0.24 – 0.36	0.25 – 0.38
Undeveloped Desert	0.30 – 0.40	0.33 – 0.44	0.36 – 0.48	0.38 – 0.50
Mountain Terrain (Slopes > 10%)	0.60 – 0.80	0.66 – 0.88	0.72 – 0.95	0.75 – 0.95

Note: Values of C for 25, 50 and 100 Year were derived using frequency adjustment factors of 1.10, 1.20, and 1.25, respectively, with an upper limit of 0.95 for C for the 2-10 Year values.

S.O. No. _____

Subject: Amount of flow needed to drain the Retention Basins

Sheet No. _____ of _____

Drawing No. _____

Computed by [illegible] Checked By CWR Date 1/12/01

Baker

BASIN 3 96.24 acre-ft (43560) = 4,192,214.4 cf

36 HRS DRAIN TIME (3600s) = 129,600s

$$\frac{4,192,214.4 \text{ cf}}{129,600 \text{ s}} = 32.3 \text{ cfs}$$

24" pipe will need to convey 32.3 cfs to drain BASIN in 36 HRS

SEE CULVERT MASTER OUTPUT — IF 54" pipe is ASSUMED TO BE HALF-full the 24" will Discharge 33.21 cfs which exceeds the 32.3 cfs needed

BASIN 1&2 13.52 acre-ft (43560) = 588,931.2 cf

36 HRS DRAIN TIME = 129,600 s

$$\frac{588,931.2}{129,600} = 4.5 \text{ cfs}$$

24" PIPE WILL NEED TO DRAIN 4.5 cfs TO DRAIN BASIN IN 36 HRS

SEE CULVERT MASTER OUTPUT — IF 36" pipe is assumed TO BE half full the 24" WILL Discharge 29.37 cfs

which exceeds the 4.5 cfs needed

Culvert Calculator Report
43rd Basin 3

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	1,143.00	ft	Headwater Depth/ Height	6.00	
Computed Headwater Elevation	1,143.00	ft	Discharge	33.21	cfs
Inlet Control HW Elev	1,136.78	ft	Tailwater Elevation	1,126.60	ft
Outlet Control HW Elev	1,143.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	1,131.00	ft	Downstream Invert	1,123.85	ft
Length	640.00	ft	Constructed Slope	0.011172	ft/ft

Hydraulic Profile					
Profile	Pressure		Depth, Downstream	2.75	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	1.90	ft
Velocity Downstream	10.57	ft/s	Critical Slope	0.018682	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev	1,143.00	ft	Upstream Velocity Head	1.74	ft
Ke	0.50		Entrance Loss	0.87	ft

Inlet Control Properties					
Inlet Control HW Elev	1,136.78	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	3.1	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
43rd Basin 1-2

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	1,136.00	ft	Headwater Depth/ Height	3.70	
Computed Headwater Elevation	1,136.00	ft	Discharge	29.37	cfs
Inlet Control HW Elev	1,133.41	ft	Tailwater Elevation	1,125.10	ft
Outlet Control HW Elev	1,136.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	1,128.60	ft	Downstream Invert	1,123.60	ft
Length	500.00	ft	Constructed Slope	0.010000	ft/ft

Hydraulic Profile					
Profile	CompositeM2Pressure		Depth, Downstream	1.85	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	1.85	ft
Velocity Downstream	9.67	ft/s	Critical Slope	0.014600	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev	1,136.00	ft	Upstream Velocity Head	1.36	ft
Ke	0.50		Entrance Loss	0.68	ft

Inlet Control Properties					
Inlet Control HW Elev	1,133.41	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	3.1	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

APPENDIX C

Rational Method and Catch Basin Location

1. Rainfall Intensity
2. Figure 3.2 from FCDMC Hydrology Manual
3. Discharge Calculations and Catch Basin Design for:
   - Grand Avenue (East and West Bound Lanes)
   - Street Connector '43C'
   - Street Connector '43D'
   - Street Connector 'CA'
   - Street Connector 'CB'

Project:	43rd Overpass at Grand Avenue and Camelback		Baker
Subject	Development of the rainfall depths of different durations for different recurrence intervals		
		File Name:	Rainfa51.xls
Computed By: WC	**Checked By:**	**Date:**	Jan. 04, 2001

The values of the rainfall depths read from the isopluvial maps at the end of ADOT's hydrology manual are listed in the table below:

Precipitation depths in inches

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
6-hr	1.20					3.00
24-hr	1.40					3.80

The values of the 1 hour Precipitation depths for the different recurrence intervals were calcualted using the equations listed in the ADOT's hydrology manual.

Precipitation depths in inches

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1-hr	**0.96**					**2.28**
Zone						**8**

The values of the rainfall depths for the different recurrence intervals were calcualted using the equations listed in the ADOT's hydrology manual. The isopluvial maps used to generate the input are included at the end of this appendix.

Table A1. Rainfall Depths in Inches for Different Recurrence Intervals

Duration	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
5-min	0.33	0.41	0.47	0.55	0.62	0.68	0.84
10-min	0.49	0.62	0.71	0.85	0.95	1.05	1.29
15-min	0.59	0.77	0.90	1.07	1.21	1.35	1.66
30-min	0.79	1.04	1.21	1.45	1.64	1.83	2.26
1-hr	0.96	1.28	1.50	1.81	2.05	2.28	2.83
2-hr	1.04	1.40	1.65	2.00	2.26	2.53	3.14
3-hr	1.10	1.49	1.75	2.12	2.41	2.69	3.35
6-hr	1.20	1.64	1.94	2.36	2.68	3.00	3.74
12-hr	1.30	1.82	2.17	2.66	3.03	3.40	4.26
24-hr	1.40	2.00	2.40	2.95	3.38	3.80	4.78

Intensity (in/hr) ADOT

Duration	10-yr	25-yr	50-yr	100-yr	500-yr
10-min	**4.28**	5.07	**5.69**	6.30	7.71
15-min	3.60	4.30	4.84	5.39	6.64
30-min	2.42	2.90	3.28	3.65	4.51
1-hr	1.50	1.81	2.05	2.28	2.83

Intensity (in/hr) Maricopa County Standard

Duration	10-yr	25-yr	50-yr	100-yr	
5-min	5.80	7.05	8.10	9.00	
10-min	**4.50**	5.45	**6.20**	**6.95**	
15-min	3.75	4.65	5.30	5.90	
30-min	2.55	3.10	3.55	4.00	

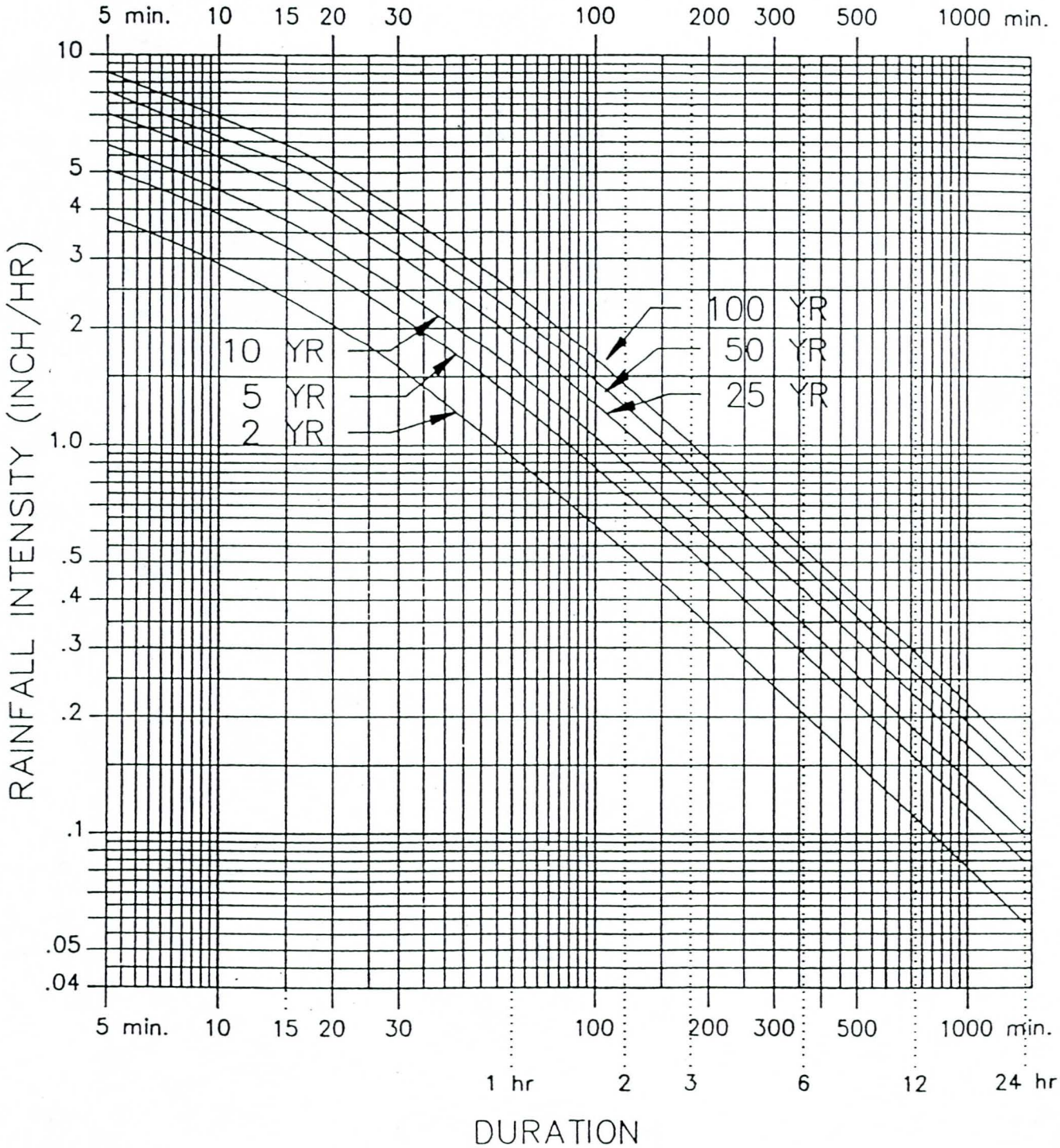

Figure 3.2
Rainfall Intensity-Duration-Frequency Relation
(Phoenix Metro Area)

Calculations for Grand Avenue
10-year Storm

Project: Grand Avenue Overpass at Camelback Road/43rd Avenue
Subject: Pavement Drainage Analysis

Computed By: FTG **Checked By:** _____ **Filename:** 43cb-calc.xls **Date:** Dec 00 **a = 1** **n = 0.016**

10-year Computations

Inlet No.	EB Station	Q10 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E (%)	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (ft)	V (fps)	Inlet Type	L (ft)	W (ft)
115	257+00.00	3.70	3.70	0.022	0.023	0.0677	16.00	8.75	90	3.33	0.37	3.70	0.28	3.89	Combination	11.50	1.75
113	254+50.00	1.28	1.65	0.023	0.020	0.0677	16.00	6.55	100	1.65	0.00	1.65	0.21	3.26	Combination	11.50	1.75
110	250+25.00	2.18	2.18	0.023	0.020	0.0677	16.00	7.46	98	2.14	0.04	2.18	0.23	3.44	Combination	11.50	1.75
108	248+00.00	2.21	2.25	0.023	0.011	0.0677	14.00	10.89	95	2.13	0.12	2.25	0.22	3.02	Combination	11.50	1.75
106	245+00.00	1.87	1.99	0.010	0.027	0.0677	10.75	7.07	98	1.96	0.03	1.99	0.27	2.61	Grate/Slotted	8.00	2.00
103	242+00.00	1.41	1.44	0.004	0.027	0.0677	10.75	7.51	100	1.44	0.00	1.44	0.28	1.70	Grate/Slotted	8.00	2.00
102	240+80.00	0.96	0.96	0.004	0.016	0.0677	10.75	8.46	100	0.96	0.00	0.96	0.24	1.40	Grate/Slotted	6.00	2.00
100	238+50.00	1.09	1.09	0.004	0.020	0.0677	8.10	7.88	99	1.08	0.01	1.09	0.25	1.49	Combination	7.50	1.75
117	266+90.00	1.47	1.47	0.009	0.020	0.0677	16.00	7.48	100	1.47	0.00	1.47	0.25	2.23	Grate/Slotted	8.00	2.00
119	269+00.00	1.10	1.10	0.015	0.020	0.0677	16.00	5.61	100	1.10	0.00	1.10	0.21	2.66	Grate/Slotted	6.00	2.00
120	272+75.00	1.96	1.96	0.027	0.020	0.0677	16.00	6.86	99	1.94	0.02	1.96	0.22	3.59	Combination	11.50	1.75
123	275+85.00	1.61	1.63	0.029	0.020	0.0677	16.00	6.13	99	1.62	0.01	1.63	0.21	3.60	Combination	11.50	1.75
124	277+75.00	1.60	1.61	0.016	0.009	0.0677	13.00	11.47	100	1.61	0.00	1.61	0.21	2.34	Combination	11.50	1.75
126	279+61.00	1.19	1.19	0.003	0.023	0.0677	10.75	8.06	100	1.19	0.00	1.19	0.28	1.40	Grate/Slotted	6.00	2.00
129	280+11.00	1.13	1.13	0.000	0.023	0.0677	10.75	7.27	100	1.13	0.00	1.13	0.34	N/A	Grate	N/A	2.00
130	280+61.00	0.65	0.65	0.003	0.023	0.0677	10.75	6.03	100	0.65	0.00	0.65	0.23	1.26	Grate/Slotted	6.00	2.00
132	282+00.00	0.87	0.88	0.004	0.023	0.0677	10.75	6.53	100	0.88	0.00	0.88	0.24	1.50	Grate/Slotted	6.00	2.00
134	284+00.00	1.37	1.37	0.003	0.023	0.0677	10.75	8.59	99	1.36	0.01	1.37	0.29	1.45	Grate/Slotted	6.00	2.00
137	287+16.00	0.26	0.26	0.002	0.012	0.0677	8.00	6.28	100	0.26	0.00	0.26	0.17	0.80	Combination	3.50	1.75
	287+75.00	0.00	0.00	0.002	0.020	0.0677											

10-year Computations

	WB Station	Q10 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (ft)	V (fps)	Inlet Type	L (ft)	W (ft)
114	257+00.00	3.70	3.70	0.022	0.023	0.0677	10.75	8.57	99	3.65	0.05	3.70	0.29	3.94	Grate/Slotted	16.00	2.00
112	254+50.00	1.30	1.35	0.023	0.016	0.0677	10.75	6.34	100	1.35	0.00	1.35	0.20	3.17	Grate/Slotted	8.00	2.00
111	250+25.00	2.18	2.18	0.023	0.020	0.0677	8.00	7.46	98	2.14	0.04	2.18	0.23	3.44	Combination	11.50	1.75
109	248+70.00	0.17	0.21	0.023	0.020	0.0677	8.00	1.60	100	0.21	0.00	0.21	0.11	2.01	Grate	3.00	1.75
107	246+00.00	2.22	2.22	0.015	0.023	0.0677	8.00	7.63	99	2.19	0.03	2.22	0.25	3.00	Combination	11.50	1.75
105	244+00.00	1.31	1.34	0.005	0.027	0.0677	8.00	7.07	99	1.33	0.01	1.34	0.26	1.80	Combination	7.50	1.75
104	242+00.00	1.05	1.06	0.004	0.027	0.0677	8.00	6.71	100	1.06	0.00	1.06	0.25	1.57	Combination	7.50	1.75
99	240+80.00	0.58	0.58	0.004	0.020	0.0677	8.00	6.01	100	0.58	0.00	0.58	0.20	1.33	Combination	7.50	1.75
101	238+50.00	1.11	1.11	0.004	0.020	0.0677	8.00	8.17	100	1.11	0.00	1.11	0.25	1.49	Combination	7.50	1.75
116	266+90.00	1.47	1.47	0.009	0.011	0.0677	10.75	10.72	99	1.45	0.02	1.47	0.23	1.97	Grate/Slotted	8.00	2.00
118	269+00.00	1.10	1.12	0.015	0.020	0.0677	16.00	5.67	100	1.12	0.00	1.12	0.21	2.67	Grate/Slotted	6.00	2.00
121	272+75.00	1.96	1.96	0.027	0.020	0.0677	16.00	6.55	97	1.91	0.05	1.96	0.23	3.73	Grate/Slotted	8.00	2.00
122	274+34.00	0.82	0.91	0.030	0.020	0.0677	16.00	4.42	100	0.91	0.00	0.91	0.17	3.36	Combination	11.50	1.75
125	277+75.00	2.61	2.61	0.016	0.020	0.0677	16.00	8.77	100	2.61	0.00	2.61	0.26	3.08	Combination	19.50	1.75
127	279+61.00	1.29	1.29	0.003	0.023	0.0677	16.00	8.53	100	1.28	0.01	1.29	0.27	1.41	Combination	7.50	1.75
128	280+11.00	0.65	0.66	0.000	0.023	0.0677	15.50	5.41	100	0.66	0.00	0.66	0.29	N/A	Grate	3.00	1.75
131	280+61.00	0.87	0.88	0.003	0.023	0.0677	15.50	7.23	100	0.88	0.00	0.88	0.24	1.30	Combination	7.50	1.75
133	282+00.00	1.13	1.13	0.004	0.023	0.0677	15.50	7.57	99	1.12	0.01	1.13	0.25	1.53	Combination	7.50	1.75
135	284+00.00	1.13	1.13	0.003	0.023	0.0677	13.75	8.06	100	1.13	0.00	1.13	0.26	1.37	Combination	7.50	1.75
136	287+16.00	0.29	0.29	0.002	0.020	0.0677	10.75	4.63	100	0.29	0.00	0.29	0.19	0.93	Combination	7.50	2.00
	287+75.00	0.00	0.00	0.002	0.020	0.0677											

43rd Avenue Pavement Drainage Discharge - Q10

East Bound

Inlet No.	Station	Width	Area	Q10	i_{10}	C
		(ft)	(acres)	(cfs)	(in/hr)	
	East Bound Lanes					
	264+08.88	53.25	0.00000	0.00	4.50	0.95
	264+00.00	53.25	0.01086	0.05	4.50	0.95
	263+00.00	53.25	0.13310	0.57	4.50	0.95
	262+00.00	53.25	0.25535	1.09	4.50	0.95
	261+00.00	53.25	0.37759	1.61	4.50	0.95
	260+00.00	53.25	0.49984	2.14	4.50	0.95
	259+00.00	53.25	0.62208	2.66	4.50	0.95
	258+00.00	53.25	0.74433	3.18	4.50	0.95
	257+82.00	53.25	0.76633	3.28	4.50	0.95
115	**257+00.00**	**52.33**	**0.86571**	**3.70**	4.50	0.95
	256+00.00	52.33	0.12013	0.51	4.50	0.95
	255+00.00	52.33	0.24027	1.03	4.50	0.95
	254+70.00	52.33	0.27631	1.18	4.50	0.95
	254+69.00	52.33	0.27751	1.19	4.50	0.95
113	**254+50.00**	**52.33**	**0.30033**	**1.28**	**4.50**	0.95
	254+00.00	52.33	0.06007	0.26	4.50	0.95
	253+00.00	52.33	0.18020	0.77	4.50	0.95
	252+00.00	52.33	0.30033	1.28	4.50	0.95
	251+00.00	52.33	0.42047	1.80	4.50	0.95
110	**250+25.00**	**52.33**	**0.51057**	**2.18**	**4.50**	0.95
	250+20.00	83.80	0.12500	0.53	4.50	0.95
	249+00.00	77.22	0.34680	1.48	4.50	0.95
	248+80.00	76.13	0.38200	1.63	4.50	0.95
	248+79.00	76.07	0.38375	1.64	4.50	0.95
108	**248+00.00**	**71.74**	**0.51778**	**2.21**	**4.50**	0.95
	247+13.00	66.97	0.13852	0.59	4.50	0.95
	247+00.00	66.26	0.15840	0.68	4.50	0.95
	246+24.00	62.09	0.27037	1.16	4.50	0.95
	246+00.00	60.78	0.30421	1.30	4.50	0.95
106	**245+00.00**	**55.29**	**0.43744**	**1.87**	**4.50**	0.95
	244+00.00	49.81	0.12064	0.52	4.50	0.95
	243+00.00	44.33	0.22870	0.98	4.50	0.95
	242+50.00	44.33	0.27959	1.20	4.50	0.95
103	**242+00.00**	**44.33**	**0.33047**	**1.41**	**4.50**	0.95
	241+00.00	44.33	0.10177	0.44	4.50	0.95
102	**240+80.00**	**44.33**	**0.22389**	**0.96**	4.50	0.95
	240+00.00	44.33	0.10177	0.44	4.50	0.95
	239+00.00	44.33	0.20354	0.87	4.50	0.95
100	**238+50.00**	**44.33**	**0.25442**	**1.09**	**4.50**	0.095

43rd Avenue Pavement Drainage Discharge - Q10

East Bound

Inlet No.	Station	Width	Area	Q10	i_{10}	C
		(ft)	(acres)	(cfs)	(in/hr)	
	East Bound Lanes					
	264+08.88	53.25	0.00000	0.00	4.50	0.95
	265+00.00	53.25	0.11139	0.48	4.50	0.95
	266+00.00	53.25	0.23363	1.00	4.50	0.95
117	**266+90.00**	**53.25**	**0.34365**	**1.47**	4.50	0.95
	267+00.00	53.25	0.01222	0.05	4.50	0.95
	268+00.00	53.25	0.13447	0.57	4.50	0.95
119	**269+00.00**	**53.25**	**0.25671**	**1.10**	**4.50**	0.95
	270+00.00	53.25	0.12225	0.52	4.50	0.95
	271+00.00	53.25	0.24449	1.05	4.50	0.95
120	**272+75.00**	**53.25**	**0.45842**	**1.96**	**4.50**	0.95
	273+00.00	53.25	0.03056	0.13	4.50	0.95
	274+00.00	53.25	0.15281	0.65	4.50	0.95
	275+00.00	52.33	0.27400	1.17	4.50	0.95
123	**275+85.00**	**52.33**	**0.37611**	**1.61**	**4.50**	0.95
	275+87.00	94.41	0.00337	0.01	4.50	0.95
	276+00.00	93.30	0.03138	0.13	4.50	0.95
	277+00.00	84.78	0.23579	1.01	4.50	0.95
	277+21.00	83.00	0.27624	1.18	4.50	0.95
	277+22.00	82.91	0.27814	1.19	4.50	0.95
124	**277+75.00**	**74.45**	**0.37387**	**1.60**	**4.50**	0.95
	278+00.00	70.46	0.04158	0.18	4.50	0.95
	278+11.00	68.70	0.05915	0.25	4.50	0.95
126	**279+61.00**	**58.93**	**0.27889**	**1.19**	4.50	0.95
129	**280+11.00**	**55.67**	**0.06577**	**0.28**	**4.50**	0.95
						0.95
	287+75.00	44.33	0.00000	0.00	4.50	0.95
137	**287+16.00**	**44.33**	**0.06004**	**0.26**	4.50	0.95
	286+00.00	44.33	0.11805	0.50	4.50	0.95
	285+50.00	44.33	0.16893	0.72	4.50	0.95
134	**284+00.00**	**44.33**	**0.32159**	**1.37**	4.50	0.95
	283+50.00	44.33	0.05088	0.22	4.50	0.95
132	**282+00.00**	**44.33**	**0.20354**	**0.87**	4.50	0.95
	281+85.00	44.33	0.01527	0.07	4.50	0.95
130	**280+61.00**	**52.41**	**0.15296**	**0.65**	4.50	0.95
129	**280+11.00**	**55.67**	**0.26549**	**1.13**	4.50	0.95

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRANT

PROJECT NO.: 24328

INLET NO.: CB100

STATION: 238+50

DRAINAGE AREA: 0.25Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	1.09	8.10

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.584	0.25	1.49

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.67	6.00	0.860	0.94	0.15
Reticuline	1.75	1.50	0.990	0.14	0.01
Combination			0.991	1.08	0.01

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB100

STATION: 238+50

DRAINAGE AREA: 0.25Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	1.09	7.88

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.663	0.25	1.50

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	6.48	4.00	0.820	0.89	0.20
Reticuline	2.00	1.50	0.990	0.19	0.01
Combination			0.991	1.08	0.01

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB102

STATION: 240+80

DRAINAGE AREA: 0.22Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.016	0.016	0.96	8.46

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.662	0.24	1.40

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	6.21	4.00	0.840	0.80	0.15
Reticuline	2.00	1.50	1.000	0.15	0.00
Combination			1.000	0.96	0.00

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*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB103

STATION: 242+00

DRAINAGE AREA: 0.33Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.027	0.016	1.44	7.51

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.647	0.28	1.70

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	7.23	5.36	0.910	1.31	0.13
Reticuline	2.00	1.50	1.000	0.12	0.00
Combination			1.000	1.44	0.00

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*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB106

STATION: 245+00

DRAINAGE AREA: 0.44Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.010	0.027	0.016	1.99	7.07

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.675	0.27	2.61

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	10.72	5.30	0.700	1.40	0.59
Reticuline	2.00	1.50	0.930	0.55	0.03
Combination			0.985	1.96	0.03

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*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB108

STATION: 248+00

DRAINAGE AREA: 0.51Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.011	0.016	2.25	10.89

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.529	0.22	3.02

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	16.55	9.20	0.670	1.51	0.74
Reticuline	1.75	1.50	0.830	0.61	0.12
Combination			0.947	2.13	0.12

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*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB110

STATION: 250+25

DRAINAGE AREA: 0.51Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.020	0.016	2.18	7.46

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.625	0.23	3.44

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	14.64	9.20	0.730	1.61	0.57
Reticuline	1.75	1.50	0.930	0.53	0.04
Combination			0.982	2.14	0.04

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*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB113

STATION: 254+50

DRAINAGE AREA: 0.3 Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.020	0.016	1.65	6.55

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.688	0.21	3.26

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	12.47	9.20	0.820	1.35	0.29
Reticuline	1.75	1.50	0.990	0.28	0.00
Combination			1.000	1.65	0.00

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*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB115

STATION: 257+00

DRAINAGE AREA: 0.86Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.022	0.023	0.016	3.70	8.75

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.532	0.28	3.89

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	19.14	9.20	0.600	2.23	1.47
Reticuline	1.75	1.50	0.740	1.09	0.37
Combination			0.900	3.33	0.37

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB117

STATION: 266+90

DRAINAGE AREA: 0.34Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.020	0.016	1.47	7.48

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.688	0.25	2.23

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	9.22	5.36	0.790	1.16	0.31
Reticuline	2.00	1.50	0.990	0.30	0.00
Combination			1.000	1.47	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB119

STATION: 269+00

DRAINAGE AREA: 0.26Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.020	0.016	1.10	5.61

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.820	0.21	2.66

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	8.77	4.00	0.660	0.73	0.37
Reticuline	2.00	1.50	0.990	0.36	0.00
Combination			1.000	1.10	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB120

STATION: 272+75

DRAINAGE AREA: 0.46Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.027	0.020	0.016	1.96	6.86

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.666	0.22	3.59

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	14.27	9.20	0.750	1.47	0.49
Reticuline	1.75	1.50	0.960	0.47	0.02
Combination			0.990	1.94	0.02

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB123

STATION: 275+85

DRAINAGE AREA: 0.38Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.029	0.020	0.016	1.63	6.13

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.720	0.21	3.60

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	13.02	9.20	0.790	1.30	0.33
Reticuline	1.75	1.50	0.990	0.32	0.01
Combination			0.994	1.62	0.01

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB124

STATION: 277+75

DRAINAGE AREA: 0.37Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.016	0.009	0.016	1.61	11.47

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.537	0.21	2.34

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	12.92	9.20	0.800	1.29	0.32
Reticuline	1.75	1.50	0.970	0.31	0.00
Combination			1.000	1.61	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB126

STATION: 279+61

DRAINAGE AREA: 0.28Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.19	8.06

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.633	0.28	1.40

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	6.25	4.00	0.840	1.00	0.19
Reticuline	2.00	1.50	0.990	0.18	0.00
Combination			1.000	1.19	0.00

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB129

STATION: 280+11

DRAINAGE AREA: 0.27Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.023	0.109	0.016	2.00	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	W (ft)	T (ft)	d (ft)	Qi (cfs)
Reticuline	1.50	2.00	7.27	0.34	1.13

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB130

STATION: 280+61

DRAINAGE AREA: 0.15Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	0.65	6.03

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.772	0.23	1.26

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	4.44	4.00	0.980	0.63	0.01
Reticuline	2.00	1.50	1.000	0.00	0.00
Combination			1.000	0.65	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB132

STATION: 282+00

DRAINAGE AREA: 0.2 Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.023	0.016	0.88	6.53

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.735	0.24	1.50

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	5.63	4.00	0.890	0.78	0.10
Reticuline	2.00	1.50	1.000	0.10	0.00
Combination			1.000	0.88	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB134

STATION: 284+00

DRAINAGE AREA: 0.32Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.37	8.59

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.602	0.29	1.45

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	6.76	4.00	0.790	1.09	0.27
Reticuline	2.00	1.50	0.960	0.26	0.01
Combination			0.993	1.36	0.01

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB137

STATION: 287+16

DRAINAGE AREA: 0.06Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.002	0.012	0.016	0.26	6.28

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.786	0.17	0.80

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	2.61	2.80	0.700	0.18	0.07
Reticuline	1.75	1.50	1.000	0.07	0.00
Combination			1.000	0.26	0.00

43rd Avenue Pavement Drainage Discharge - Q10
West Bound

Inlet No.	Station	Width	Area	Q10	i_{10}	C
		(ft)	(acres)	(cfs)	(in/hr)	
	West Bound Lanes					
	264+08.88	53.25	0.00000	0.00	4.50	0.095
	264+00.00	53.25	0.01086	0.05	4.50	0.095
	263+00.00	53.25	0.13310	0.57	4.50	0.095
	262+00.00	53.25	0.25535	1.09	4.50	0.095
	261+00.00	53.25	0.37759	1.61	4.50	0.095
	260+00.00	53.25	0.49984	2.14	4.50	0.095
	259+00.00	53.25	0.62208	2.66	4.50	0.095
	258+00.00	53.25	0.74433	3.18	4.50	0.095
114	**257+00.00**	**53.25**	**0.86657**	**3.70**	**4.50**	0.095
	256+00.00	53.25	0.12225	0.52	4.50	0.095
	255+00.00	53.25	0.24449	1.05	4.50	0.095
	254+70.00	53.25	0.28116	1.20	4.50	0.095
	254+69.00	52.33	0.28238	1.21	4.50	0.095
112	**254+50.00**	**52.33**	**0.30520**	**1.30**	**4.50**	0.095
	254+00.00	52.33	0.06007	0.26	4.50	0.095
	253+00.00	52.33	0.18020	0.77	4.50	0.095
	252+00.00	52.33	0.30033	1.28	4.50	0.095
	251+00.00	52.33	0.42047	1.80	4.50	0.095
111	**250+25.00**	**52.33**	**0.51057**	**2.18**	**4.50**	0.095
	249+00.00	52.33	0.15017	0.64	4.50	0.095
	248+80.00	52.33	0.02403	0.10	4.50	0.095
109	**248+70.00**	**85.62**	**0.03986**	**0.17**	**4.50**	0.095
	248+00.00	86.58	0.13836	0.59	4.50	0.095
	247+13.00	87.76	0.31245	1.34	4.50	0.095
	247+00.00	85.97	0.33838	1.45	4.50	0.095
	246+24.00	75.50	0.47924	2.05	4.50	0.095
107	**246+00.00**	**73.82**	**0.52037**	**2.22**	**4.50**	0.095
	245+00.00	66.82	0.16144	0.69	4.50	0.095
105	**244+00.00**	**59.83**	**0.30681**	**1.31**	**4.50**	0.095
	243+00.00	52.83	0.12931	0.55	4.50	0.095
	242+50.00	49.33	0.18794	0.80	4.50	0.095
104	**242+00.00**	**49.33**	**0.24456**	**1.05**	**4.50**	0.095
99	**240+80.00**	**49.33**	**0.13590**	**0.58**	**4.50**	0.095
	240+00.00	49.33	0.09060	0.39	4.50	0.095
	239+00.00	49.33	0.20384	0.87	4.50	0.095
101	**238+50.00**	**49.33**	**0.26047**	**1.11**	**4.50**	0.095

43rd Avenue Pavement Drainage Discharge - Q10
West Bound

Inlet No.	Station	Width	Area	Q10	i_{10}	C
		(ft)	(acres)	(cfs)	(in/hr)	
	West Bound Lanes					
	264+08.88	53.25	0.00000	0.00	4.50	0.095
	265+00.00	53.25	0.11139	0.48	4.50	0.095
	266+00.00	53.25	0.23363	1.00	4.50	0.095
116	**266+90.00**	**53.25**	**0.34365**	**1.47**	**4.50**	0.095
	267+00.00	53.25	0.01222	0.05	4.50	0.095
	268+00.00	53.25	0.13447	0.57	4.50	0.095
118	**269+00.00**	**53.25**	**0.25671**	**1.10**	**4.50**	0.095
	270+00.00	53.25	0.12225	0.52	4.50	0.095
	271+00.00	53.25	0.24449	1.05	4.50	0.095
121	**272+75.00**	**53.25**	**0.45842**	**1.96**	**4.50**	0.095
	273+00.00	53.25	0.03056	0.13	4.50	0.095
	274+00.00	52.33	0.15175	0.65	4.50	0.095
122	**274+34.00**	**52.33**	**0.19260**	**0.82**	**4.50**	0.095
	274+35.00	84.60	0.00157	0.01	4.50	0.095
	275+00.00	83.45	0.12695	0.54	4.50	0.095
	275+86.00	78.54	0.28686	1.23	4.50	0.095
	275+87.00	78.46	0.28867	1.23	4.50	0.095
	276+00.00	77.36	0.31192	1.33	4.50	0.095
	276+25.00	75.26	0.35571	1.52	4.50	0.095
	277+00.00	73.77	0.48401	2.07	4.50	0.095
	277+21.00	73.35	0.51947	2.22	4.50	0.095
	277+22.00	73.33	0.52115	2.23	4.50	0.095
125	**277+75.00**	**72.29**	**0.60974**	**2.61**	**4.50**	0.095
	278+00.00	71.79	0.04134	0.18	4.50	0.095
	278+11.00	71.57	0.05945	0.25	4.50	0.095
127	**279+61.00**	**68.61**	**0.30081**	**1.29**	**4.50**	0.095
128	**280+11.00**	**67.54**	**0.07814**	**0.33**	**4.50**	0.095
	287+75.00	49.33	0.00000	0.00	4.50	0.095
136	**287+16.00**	**49.33**	**0.06682**	**0.29**	**4.50**	0.095
	286+25.00	49.33	0.10305	0.44	4.50	0.095
	285+45.00	49.59	0.09083	0.39	4.50	0.095
	285+00.00	51.10	0.14284	0.61	4.50	0.095
135	**284+00.00**	**54.46**	**0.26400**	**1.13**	**4.50**	0.095
	283+00.00	57.82	0.12889	0.55	4.50	0.095
133	**282+00.00**	**61.19**	**0.26549**	**1.13**	**4.50**	0.095
	281+85.00	61.69	0.02116	0.09	4.50	0.095
131	**280+61.00**	**65.86**	**0.20270**	**0.87**	**4.50**	0.095
128	**280+11.00**	**67.54**	**0.15134**	**0.65**	**4.50**	0.095

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-03-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB136

STATION: 287+16

DRAINAGE AREA: 0.07Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.002	0.020	0.016	0.29	5.00

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.814	0.18	0.87

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	2.67	2.80	0.690	0.20	0.08
Reticuline	1.75	1.50	0.990	0.07	0.00
Combination			1.000	0.29	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB135

STATION: 284+00

DRAINAGE AREA: 0.26Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.13	8.06

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.569	0.26	1.37

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.21	6.00	0.900	1.01	0.12
P-1-1/8	1.75	1.50	0.990	0.11	0.00
Combination			1.000	1.13	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB133

STATION: 282+00

DRAINAGE AREA: 0.27Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.023	0.016	1.13	7.57

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.598	0.25	1.53

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.63	6.00	0.860	0.98	0.14
Reticuline	1.75	1.50	0.990	0.13	0.01
Combination			0.991	1.12	0.01

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB131

STATION: 280+61

DRAINAGE AREA: 0.2 Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	0.88	7.23

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.620	0.24	1.30

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	5.40	5.42	0.900	0.79	0.08
Reticuline	1.75	1.50	1.000	0.07	0.00
Combination			1.000	0.88	0.00

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB128

STATION: 280+11

DRAINAGE AREA: 0.15Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.023	0.115	0.016	1.75	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	W (ft)	T (ft)	d (ft)	Qi (cfs)
Reticuline	1.50	1.75	5.41	0.29	0.66

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB127

STATION: 279+61

DRAINAGE AREA: 0.3 Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.29	8.53

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.542	0.27	1.41

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.71	6.00	0.860	1.11	0.17
Reticuline	1.75	1.50	0.970	0.16	0.01
Combination			0.992	1.28	0.01

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB125

STATION: 277+75

DRAINAGE AREA: 0.61Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.016	0.020	0.016	2.61	8.77

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.547	0.26	3.08

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	15.01	15.60	0.990	2.59	0.01
Reticuline	1.75	1.50	1.000	0.00	0.00
Combination			1.000	2.61	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB122

STATION: 274+34

DRAINAGE AREA: 0.19Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.030	0.020	0.016	0.91	4.42

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.861	0.17	3.36

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	9.46	9.20	0.950	0.86	0.05
Reticuline	1.75	1.50	1.000	0.05	0.00
Combination			1.000	0.91	0.00

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
```

DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB121

STATION: 272+75

DRAINAGE AREA: 0.46Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.027	0.020	0.016	1.96	6.55

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.753	0.23	3.73

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	13.89	5.36	0.580	1.14	0.82
Reticuline	2.00	1.50	0.940	0.77	0.05
Combination			0.974	1.91	0.05

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB118

STATION: 269+00

DRAINAGE AREA: 0.26Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.020	0.016	1.12	5.67

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.816	0.21	2.67

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	8.86	4.00	0.650	0.73	0.38
Reticuline	2.00	1.50	0.990	0.37	0.00
Combination			1.000	1.12	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB116

STATION: 266+90

DRAINAGE AREA: 0.34Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.011	0.016	1.47	10.72

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.605	0.23	1.97

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	10.06	5.36	0.740	1.09	0.37
Reticuline	2.00	1.50	0.960	0.35	0.02
Combination			0.986	1.45	0.02

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB101

STATION: 238+50

DRAINAGE AREA: 0.26Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	1.11	8.17

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.580	0.25	1.49

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.73	6.00	0.860	0.95	0.16
Reticuline	1.75	1.50	0.980	0.15	0.00
Combination			1.000	1.11	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 01-02-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB99

STATION: 240+80

DRAINAGE AREA: 0.14Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	0.58	6.01

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.731	0.20	1.33

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	4.61	4.50	0.840	0.49	0.08
Reticuline	1.75	1.50	1.000	0.07	0.00
Combination			1.000	0.58	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB104

STATION: 242+00

DRAINAGE AREA: 0.24Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.027	0.016	1.06	6.71

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.637	0.25	1.57

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.23	5.80	0.870	0.93	0.12
Reticuline	1.75	1.50	0.990	0.11	0.00
Combination			1.000	1.06	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB105

STATION: 244+00

DRAINAGE AREA: 0.31Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.005	0.027	0.016	1.34	7.07

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.611	0.26	1.80

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	7.46	6.00	0.800	1.08	0.25
Reticuline	1.75	1.50	0.960	0.24	0.01
Combination			0.993	1.33	0.01

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB107

STATION: 246+00

DRAINAGE AREA: 0.52Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.023	0.016	2.22	7.63

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.596	0.25	3.00

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	13.14	9.20	0.790	1.76	0.46
Reticuline	1.75	1.50	0.940	0.43	0.03
Combination			0.986	2.19	0.03

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB109

STATION: 248+70

DRAINAGE AREA: 0.04Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.020	0.016	0.21	1.60

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	N/A	1.000	0.11	2.01

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Reticuline	1.50	1.75	1.000	0.20	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB111

STATION: 250+25

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.020	0.016	2.18	7.46

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.625	0.23	3.44

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	14.64	9.20	0.730	1.61	0.57
Reticuline	1.75	1.50	0.930	0.53	0.04
Combination			0.982	2.14	0.04

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB112

STATION: 254+50

DRAINAGE AREA: 0.31Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.016	0.016	1.35	6.34

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.799	0.20	3.17

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	11.07	5.36	0.690	0.93	0.42
Reticuline	2.00	1.50	0.990	0.41	0.00
Combination			1.000	1.35	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-29-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB114

STATION: 257+00

DRAINAGE AREA: 0.87Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.022	0.023	0.016	3.70	8.57

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.603	0.29	3.94

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	18.68	10.72	0.780	2.90	0.79
Reticuline	2.00	1.50	0.940	0.74	0.05
Combination			0.986	3.65	0.05

Calculations for Grand Avenue
50-year Storm

Baker

Project: Grand Avenue Overpass at Camelback Road/43rd Avenue
Subject: Pavement Drainage Analysis

Computed By: FTG **Checked By:** _____ **Filename:** 43cb-calc.xls **Date:** Dec 00 **a = 1** **n = 0.016**

50-year Computations

Inlet No.	EB Station	Q50 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E (%)	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (ft)	V (fps)	Inlet Type	L (ft)	W (ft)
115	257+00.00	5.10	5.10	0.022	0.023	0.0677	22.00	10.00	82	4.16	0.94	5.10	0.31	4.17	Combination	11.50	1.75
113	254+50.00	1.77	2.71	0.023	0.020	0.0677	22.00	8.23	95	2.58	0.13	2.71	0.25	3.59	Combination	11.50	1.75
110	250+25.00	3.01	3.14	0.023	0.020	0.0677	22.00	8.78	92	2.89	0.25	3.14	0.26	3.71	Combination	11.50	1.75
108	248+00.00	3.05	3.30	0.023	0.011	0.0677	20.00	12.96	85	2.79	0.51	3.30	0.24	3.25	Combination	11.50	1.75
106	245+00.00	2.58	3.09	0.010	0.027	0.0677	16.75	8.56	92	2.84	0.25	3.09	0.31	2.88	Grate/Slotted	8.00	2.00
103	242+00.00	1.95	2.20	0.004	0.027	0.0677	16.75	9.00	99	2.17	0.03	2.20	0.32	1.87	Grate/Slotted	8.00	2.00
102	240+80.00	1.32	1.35	0.004	0.016	0.0677	16.75	9.93	98	1.32	0.03	1.35	0.26	1.50	Grate/Slotted	6.00	2.00
100	238+50.00	1.50	1.53	0.004	0.020	0.0677	14.00	9.19	98	1.50	0.03	1.53	0.28	1.62	Grate/Slotted	6.00	2.00
117	266+90.00	2.02	2.02	0.009	0.020	0.0677	22.00	8.68	97	1.96	0.06	2.02	0.27	2.36	Grate/Slotted	8.00	2.00
119	269+00.00	1.51	1.57	0.015	0.020	0.0677	22.00	6.80	97	1.52	0.05	1.57	0.23	2.80	Grate/Slotted	6.00	2.00
120	272+75.00	2.70	2.75	0.027	0.020	0.0677	22.00	8.00	95	2.61	0.14	2.75	0.24	3.84	Combination	11.50	1.75
123	275+85.00	2.22	2.36	0.029	0.020	0.0677	22.00	7.34	98	2.30	0.06	2.36	0.23	3.83	Combination	11.50	1.75
124	277+75.00	2.20	2.26	0.016	0.009	0.0677	19.00	13.44	93	2.10	0.16	2.26	0.22	2.49	Combination	11.50	1.75
126	279+61.00	1.64	1.80	0.003	0.023	0.0677	16.75	9.67	97	1.74	0.06	1.80	0.31	1.53	Grate/Slotted	6.00	2.00
129	280+11.00	1.56	1.62	0.000	0.023	0.0677	16.75	9.25	100	1.62	0.00	1.62	0.39	N/A	Grate	N/A	2.00
130	280+61.00	0.90	0.92	0.003	0.023	0.0677	16.75	7.17	100	0.92	0.00	0.92	0.25	1.34	Grate/Slotted	6.00	2.00
132	282+00.00	1.20	1.38	0.004	0.023	0.0677	16.75	8.09	98	1.36	0.02	1.38	0.28	1.62	Grate/Slotted	6.00	2.00
134	284+00.00	1.89	1.98	0.003	0.023	0.0677	16.75	10.21	91	1.80	0.18	1.98	0.31	1.55	Grate/Slotted	6.00	2.00
137	287+16.00	0.70	0.70	0.002	0.005	0.0677	14.00	10.59	87	0.61	0.09	0.70	0.22	0.92	Combination	3.50	1.75
	287+75.00	0.00	0.00	0.002	0.005	0.0677											

50-year Computations

Inlet No.	WB Station	Q50 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (ft)	V (fps)	Inlet Type	L (ft)	W (ft)
114	257+00.00	5.10	5.10	0.022	0.023	0.0677	16.75	9.85	94	4.78	0.32	5.10	0.32	4.21	Grate/Slotted	16.00	2.00
112	254+50.00	1.80	2.12	0.023	0.016	0.0677	16.75	8.11	95	2.02	0.10	2.12	0.23	3.34	Grate/Slotted	8.00	2.00
111	250+25.00	3.01	3.11	0.023	0.020	0.0677	14.00	8.75	92	2.87	0.24	3.11	0.26	3.70	Combination	11.50	1.75
109	248+70.00	0.23	0.47	0.023	0.020	0.0677	14.00	3.08	95	0.45	0.02	0.47	0.15	2.77	Grate	3.00	1.75
107	246+00.00	3.06	3.08	0.015	0.023	0.0677	14.00	8.77	94	2.90	0.18	3.08	0.28	3.22	Combination	11.50	1.75
105	244+00.00	1.81	1.99	0.005	0.027	0.0677	14.00	8.35	95	1.88	0.11	1.99	0.30	1.97	Combination	7.50	1.75
104	242+00.00	1.44	1.55	0.004	0.027	0.0677	14.00	7.88	98	1.52	0.03	1.55	0.28	1.71	Combination	7.50	1.75
99	240+80.00	0.80	0.83	0.004	0.020	0.0677	14.00	9.39	100	0.83	0.00	0.83	0.27	1.59	Combination	7.50	1.75
101	238+50.00	1.53	1.53	0.004	0.020	0.0677	14.00	7.17	97	1.48	0.05	1.53	0.23	1.40	Combination	7.50	1.75
116	266+90.00	2.02	2.02	0.009	0.011	0.0677	16.75	13.25	92	1.86	0.16	2.02	0.25	2.02	Grate/Slotted	8.00	2.00
118	269+00.00	1.51	1.67	0.015	0.020	0.0677	22.00	7.01	96	1.61	0.06	1.67	0.24	2.83	Grate/Slotted	6.00	2.00
121	272+75.00	2.70	2.76	0.027	0.020	0.0677	22.00	7.78	91	2.51	0.25	2.76	0.25	3.92	Grate/Slotted	8.00	2.00
122	274+34.00	1.13	1.38	0.030	0.020	0.0677	22.00	5.59	99	1.37	0.01	1.38	0.20	3.56	Combination	11.50	1.75
125	277+75.00	3.59	3.60	0.016	0.020	0.0677	22.00	10.06	100	3.60	0.00	3.60	0.28	3.30	Combination	19.50	1.75
127	279+61.00	1.77	1.77	0.003	0.023	0.0677	22.00	9.75	97	1.71	0.06	1.77	0.30	1.51	Combination	7.50	1.75
128	280+11.00	0.89	0.96	0.000	0.023	0.0677	21.50	6.95	100	0.96	0.00	0.96	0.32	N/A	Grate	3.00	1.75
131	280+61.00	1.19	1.24	0.003	0.023	0.0677	21.50	8.39	99	1.23	0.01	1.24	0.27	1.39	Combination	7.50	1.75
133	282+00.00	1.56	1.59	0.004	0.023	0.0677	21.50	8.77	97	1.54	0.05	1.59	0.28	1.65	Combination	7.50	1.75
135	284+00.00	1.55	1.55	0.003	0.023	0.0677	19.75	9.25	98	1.52	0.03	1.55	0.29	1.48	Combination	7.50	1.75
136	287+16.00	0.61	0.61	0.002	0.020	0.0677	16.75	7.01	100	0.61	0.00	0.61	0.24	1.02	Combination	7.50	2.00
	287+75.00	0.00	0.00	0.002	0.020	0.0677											

43rd Avenue Pavement Drainage Discharge - Q50
East Bound

Inlet No.	Station	Width	Area	Q50	i_{10}	C
		(ft)	(acres)	(cfs)	(in/hr)	
	East Bound Lanes					
	267+00.00	53.25	0.01222	0.07	6.20	0.95
	268+00.00	53.25	0.13447	0.79	6.20	0.95
119	**269+00.00**	**53.25**	**0.25671**	**1.51**	6.20	0.95
	270+00.00	53.25	0.12225	0.72	6.20	0.95
	271+00.00	53.25	0.24449	1.44	6.20	0.95
120	**272+75.00**	**53.25**	**0.45842**	**2.70**	6.20	0.95
	273+00.00	53.25	0.03056	0.18	6.20	0.95
	274+00.00	53.25	0.15281	0.90	6.20	0.95
	275+00.00	52.33	0.27400	1.61	6.20	0.95
123	**275+85.00**	**52.33**	**0.37611**	**2.22**	6.20	0.95
	275+87.00	94.41	0.00337	0.02	6.20	0.95
	276+00.00	93.30	0.03138	0.18	6.20	0.95
	277+00.00	84.78	0.23579	1.39	6.20	0.95
	277+21.00	83.00	0.27624	1.63	6.20	0.95
	277+22.00	82.91	0.27814	1.64	6.20	0.95
124	**277+75.00**	**74.45**	**0.37387**	**2.20**	6.20	0.95
	278+00.00	70.46	0.04158	0.24	6.20	0.95
	278+11.00	68.70	0.05915	0.35	6.20	0.95
126	**279+61.00**	**58.93**	**0.27889**	**1.64**	6.20	0.95
129	**280+11.00**	**55.67**	**0.06577**	**0.39**	6.20	0.95
	287+75.00	44.33	0.00000	0.00	6.20	0.95
137	**287+16.00**	**44.33**	**0.06004**	**0.35**	6.20	0.95
	286+00.00	44.33	0.11805	0.70	6.20	0.95
	285+50.00	44.33	0.16893	1.00	6.20	0.95
134	**284+00.00**	**44.33**	**0.32159**	**1.89**	6.20	0.95
	283+50.00	44.33	0.05088	0.30	6.20	0.95
132	**282+00.00**	**44.33**	**0.20354**	**1.20**	6.20	0.95
	281+85.00	44.33	0.01527	0.09	6.20	0.95
130	**280+61.00**	**52.41**	**0.15296**	**0.90**	6.20	0.95
129	**280+11.00**	**55.67**	**0.26549**	**1.56**	6.20	0.95

43rd Avenue Pavement Drainage Discharge - Q50
East Bound

Inlet No.	Station	Width (ft)	Area (acres)	Q50 (cfs)	i_{10} (in/hr)	C
East Bound Lanes						
	264+08.88	53.25	0.00000	0.00	6.20	0.95
	264+00.00	53.25	0.01086	0.06	6.20	0.95
	263+00.00	53.25	0.13310	0.78	6.20	0.95
	262+00.00	53.25	0.25535	1.50	6.20	0.95
	261+00.00	53.25	0.37759	2.22	6.20	0.95
	260+00.00	53.25	0.49984	2.94	6.20	0.95
	259+00.00	53.25	0.62208	3.66	6.20	0.95
	258+00.00	53.25	0.74433	4.38	6.20	0.95
	257+82.00	53.25	0.76633	4.51	6.20	0.95
115	**257+00.00**	**52.33**	**0.86571**	**5.10**	6.20	0.95
	256+00.00	52.33	0.12013	0.71	6.20	0.95
	255+00.00	52.33	0.24027	1.42	6.20	0.95
	254+70.00	52.33	0.27631	1.63	6.20	0.95
	254+69.00	52.33	0.27751	1.63	6.20	0.95
113	**254+50.00**	**52.33**	**0.30033**	**1.77**	6.20	0.95
	254+00.00	52.33	0.06007	0.35	6.20	0.95
	253+00.00	52.33	0.18020	1.06	6.20	0.95
	252+00.00	52.33	0.30033	1.77	6.20	0.95
	251+00.00	52.33	0.42047	2.48	6.20	0.95
110	**250+25.00**	**52.33**	**0.51057**	**3.01**	6.20	0.95
	250+20.00	83.80	0.12500	0.74	6.20	0.95
	249+00.00	77.22	0.34680	2.04	6.20	0.95
	248+80.00	76.13	0.38200	2.25	6.20	0.95
	248+79.00	76.07	0.38375	2.26	6.20	0.95
108	**248+00.00**	**71.74**	**0.51778**	**3.05**	6.20	0.95
	247+13.00	66.97	0.13852	0.82	6.20	0.95
	247+00.00	66.26	0.15840	0.93	6.20	0.95
	246+24.00	62.09	0.27037	1.59	6.20	0.95
	246+00.00	60.78	0.30421	1.79	6.20	0.95
106	**245+00.00**	**55.29**	**0.43744**	**2.58**	6.20	0.95
	244+00.00	49.81	0.12064	0.71	6.20	0.95
	243+00.00	44.33	0.22870	1.35	6.20	0.95
	242+50.00	44.33	0.27959	1.65	6.20	0.95
103	**242+00.00**	**44.33**	**0.33047**	**1.95**	6.20	0.95
	241+00.00	44.33	0.10177	0.60	6.20	0.95
102	**240+80.00**	**44.33**	**0.22389**	**1.32**	6.20	0.95
	240+00.00	44.33	0.10177	0.60	6.20	0.95
	239+00.00	44.33	0.20354	1.20	6.20	0.95
100	**238+50.00**	**44.33**	**0.25442**	**1.50**	6.20	0.95
	264+08.88	53.25	0.00000	0.00	6.20	0.95
	265+00.00	53.25	0.11139	0.66	6.20	0.95
	266+00.00	53.25	0.23363	1.38	6.20	0.95
117	**266+90.00**	**53.25**	**0.34365**	**2.02**	6.20	0.95

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB100

STATION: 238+50

DRAINAGE AREA: 0.25Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	1.53	9.19

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.588	0.28	1.62

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	7.88	4.00	0.710	1.10	0.42
Reticuline	2.00	1.50	0.900	0.38	0.03
Combination			0.980	1.50	0.03

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB102

STATION: 240+80

DRAINAGE AREA: 0.22Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.016	0.016	1.35	9.93

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.583	0.26	1.50

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	7.61	4.00	0.730	0.99	0.36
Reticuline	2.00	1.50	0.920	0.33	0.03
Combination			0.978	1.32	0.03

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB103

STATION: 242+00

DRAINAGE AREA: 0.33Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.027	0.016	2.20	9.00

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.561	0.32	1.87

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	9.14	5.36	0.790	1.75	0.45
Reticuline	2.00	1.50	0.910	0.41	0.03
Combination			0.986	2.17	0.03

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB106

STATION: 245+00

DRAINAGE AREA: 0.44Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.010	0.027	0.016	3.09	8.56

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.584	0.31	2.88

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	13.67	5.36	0.590	1.82	1.26
Reticuline	2.00	1.50	0.790	1.00	0.25
Combination			0.919	2.84	0.25

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB108

STATION: 248+00

DRAINAGE AREA: 0.51Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.011	0.016	3.30	12.96

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.449	0.24	3.25

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	21.11	9.20	0.550	1.84	1.45
Reticuline	1.75	1.50	0.640	0.94	0.51
Combination			0.845	2.79	0.51

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB110

STATION: 250+25

DRAINAGE AREA: 0.51Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.020	0.016	3.14	8.78

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.546	0.26	3.71

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	18.11	9.20	0.630	1.98	1.16
Reticuline	1.75	1.50	0.780	0.90	0.25
Combination			0.920	2.89	0.25

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB113

STATION: 254+50

DRAINAGE AREA: 0.30Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.020	0.016	2.71	8.23

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.577	0.25	3.59

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	16.62	9.20	0.670	1.82	0.88
Reticuline	1.75	1.50	0.840	0.74	0.13
Combination			0.952	2.58	0.13

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB115

STATION: 257+00

DRAINAGE AREA: 0.86Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.022	0.023	0.016	5.10	10.00

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.472	0.31	4.17

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	22.96	9.20	0.520	2.65	2.44
Reticuline	1.75	1.50	0.610	1.50	0.94
Combination			0.816	4.16	0.94

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB117

STATION: 266+90

DRAINAGE AREA: 0.34Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.020	0.016	2.02	8.68

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.615	0.27	2.36

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	11.09	5.36	0.690	1.40	0.62
Reticuline	2.00	1.50	0.900	0.55	0.06
Combination			0.970	1.96	0.06

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB119

STATION: 269+00

DRAINAGE AREA: 0.26Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.020	0.016	1.57	6.80

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.736	0.23	2.80

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	10.72	4.00	0.560	0.89	0.68
Reticuline	2.00	1.50	0.930	0.63	0.05
Combination			0.968	1.52	0.05

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB120

STATION: 272+75

DRAINAGE AREA: 0.46Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.027	0.020	0.016	2.75	8.00

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.591	0.24	3.84

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	17.37	9.20	0.650	1.79	0.96
Reticuline	1.75	1.50	0.840	0.81	0.14
Combination			0.949	2.61	0.14

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB123

STATION: 275+85

DRAINAGE AREA: 0.38Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.029	0.020	0.016	2.36	7.34

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.633	0.23	3.83

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	16.13	9.20	0.680	1.62	0.73
Reticuline	1.75	1.50	0.910	0.66	0.06
Combination			0.975	2.30	0.06

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB124

STATION: 277+75

DRAINAGE AREA: 0.37Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.016	0.009	0.016	2.26	13.44

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.462	0.22	2.49

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	16.10	9.20	0.680	1.55	0.71
Reticuline	1.75	1.50	0.770	0.54	0.16
Combination			0.929	2.10	0.16

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB126

STATION: 279+61

DRAINAGE AREA: 0.28Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.80	9.67

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.546	0.31	1.53

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	7.90	4.00	0.710	1.29	0.50
Reticuline	2.00	1.50	0.860	0.43	0.06
Combination			0.967	1.74	0.06

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB129

STATION: 280+11

DRAINAGE AREA: 0.27Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.023	0.109	0.016	2.00	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	W (ft)	T (ft)	d (ft)	Qi (cfs)
Reticuline	1.50	2.00	9.25	0.39	1.62

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB130

STATION: 280+61

DRAINAGE AREA: 0.15Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	0.92	7.17

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.689	0.25	1.34

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	5.40	4.00	0.910	0.83	0.09
Reticuline	2.00	1.50	1.000	0.09	0.00
Combination			1.000	0.92	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB132

STATION: 282+00

DRAINAGE AREA: 0.20Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.023	0.016	1.38	8.09

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.632	0.28	1.62

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	7.26	4.00	0.760	1.05	0.33
Reticuline	2.00	1.50	0.950	0.31	0.02
Combination			0.986	1.36	0.02

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB134

STATION: 284+00

DRAINAGE AREA: 0.32Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.98	10.21

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.463	0.31	1.55

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	8.55	4.00	0.670	1.34	0.63
Reticuline	2.00	1.50	0.720	0.45	0.18
Combination			0.909	1.80	0.18

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB137

STATION: 287+16

DRAINAGE AREA: 0.06Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.002	0.012	0.016	0.70	10.59

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.529	0.22	0.92

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	4.84	2.80	0.420	0.30	0.39
Reticuline	1.75	1.50	0.740	0.29	0.09
Combination			0.871	0.61	0.09

43rd Avenue Pavement Drainage Discharge - Q50
West Bound

Inlet No.	Station	Width	Area	Q50	i_{10}	C
		(ft)	(acres)	(cfs)	(in/hr)	
West Bound Lanes						
					6.20	0.95
	264+08.88	53.25	0.00000	0.00	6.20	0.95
	264+00.00	53.25	0.01086	0.06	6.20	0.95
	263+00.00	53.25	0.13310	0.78	6.20	0.95
	262+00.00	53.25	0.25535	1.50	6.20	0.95
	261+00.00	53.25	0.37759	2.22	6.20	0.95
	260+00.00	53.25	0.49984	2.94	6.20	0.95
	259+00.00	53.25	0.62208	3.66	6.20	0.95
	258+00.00	53.25	0.74433	4.38	6.20	0.95
114	**257+00.00**	**53.25**	**0.86657**	**5.10**	6.20	0.95
	256+00.00	53.25	0.12225	0.72	6.20	0.95
	255+00.00	53.25	0.24449	1.44	6.20	0.95
	254+70.00	53.25	0.28116	1.66	6.20	0.95
	254+69.00	52.33	0.28238	1.66	6.20	0.95
112	**254+50.00**	**52.33**	**0.30520**	**1.80**	6.20	0.95
	254+00.00	52.33	0.06007	0.35	6.20	0.95
	253+00.00	52.33	0.18020	1.06	6.20	0.95
	252+00.00	52.33	0.30033	1.77	6.20	0.95
	251+00.00	52.33	0.42047	2.48	6.20	0.95
111	**250+25.00**	**52.33**	**0.51057**	**3.01**	6.20	0.95
	249+00.00	52.33	0.15017	0.88	6.20	0.95
	248+80.00	52.33	0.02403	0.14	6.20	0.95
109	**248+70.00**	**85.62**	**0.03986**	**0.23**	6.20	0.95
	248+00.00	86.58	0.13836	0.81	6.20	0.95
	247+13.00	87.76	0.31245	1.84	6.20	0.95
	247+00.00	85.97	0.33838	1.99	6.20	0.95
	246+24.00	75.50	0.47924	2.82	6.20	0.95
107	**246+00.00**	**73.82**	**0.52037**	**3.06**	6.20	0.95
	245+00.00	66.82	0.16144	0.95	6.20	0.95
105	**244+00.00**	**59.83**	**0.30681**	**1.81**	6.20	0.95
	243+00.00	52.83	0.12931	0.76	6.20	0.95
	242+50.00	49.33	0.18794	1.11	6.20	0.95
104	**242+00.00**	**49.33**	**0.24456**	**1.44**	6.20	0.95
99	**240+80.00**	**49.33**	**0.13590**	**0.80**	6.20	0.95
	240+00.00	49.33	0.09060	0.53	6.20	0.95
	239+00.00	49.33	0.20384	1.20	6.20	0.95
101	**238+50.00**	**49.33**	**0.26047**	**1.53**	6.20	0.95

43rd Avenue Pavement Drainage Discharge - Q50
West Bound

Inlet No.	Station	Width	Area	Q50	i_{10}	C
		(ft)	(acres)	(cfs)	(in/hr)	
West Bound Lanes						
	264+08.88	53.25	0.00000	0.00	6.20	0.95
	265+00.00	53.25	0.11139	0.66	6.20	0.95
	266+00.00	53.25	0.23363	1.38	6.20	0.95
116	**266+90.00**	**53.25**	**0.34365**	**2.02**	6.20	0.95
	267+00.00	53.25	0.01222	0.07	6.20	0.95
	268+00.00	53.25	0.13447	0.79	6.20	0.95
118	**269+00.00**	**53.25**	**0.25671**	**1.51**	6.20	0.95
	270+00.00	53.25	0.12225	0.72	6.20	0.95
	271+00.00	53.25	0.24449	1.44	6.20	0.95
121	**272+75.00**	**53.25**	**0.45842**	**2.70**	6.20	0.95
	273+00.00	53.25	0.03056	0.18	6.20	0.95
	274+00.00	52.33	0.15175	0.89	6.20	0.95
122	**274+34.00**	**52.33**	**0.19260**	**1.13**	6.20	0.95
	274+35.00	84.60	0.00157	0.01	6.20	0.95
	275+00.00	83.45	0.12695	0.75	6.20	0.95
	275+86.00	78.54	0.28686	1.69	6.20	0.95
	275+87.00	78.46	0.28867	1.70	6.20	0.95
	276+00.00	77.36	0.31192	1.84	6.20	0.95
	276+25.00	75.26	0.35571	2.10	6.20	0.95
	277+00.00	73.77	0.48401	2.85	6.20	0.95
	277+21.00	73.35	0.51947	3.06		
	277+22.00	73.33	0.52115	3.07	6.20	0.95
125	**277+75.00**	**72.29**	**0.60974**	**3.59**	6.20	0.95
	278+00.00	71.79	0.04134	0.24	6.20	0.95
	278+11.00	71.57	0.05945	0.35	6.20	0.95
127	**279+61.00**	**68.61**	**0.30081**	**1.77**	6.20	0.95
128	**280+11.00**	**67.54**	**0.07814**	**0.46**	6.20	0.95
	287+75.00	49.33	0.00000	0.00	6.20	0.95
136	**287+16.00**	**49.33**	**0.06682**	**0.39**	6.20	0.95
	286+25.00	49.33	0.10305	0.61	6.20	0.95
	285+45.00	49.59	0.09083	0.53	6.20	0.95
	285+00.00	51.10	0.14284	0.84	6.20	0.95
135	**284+00.00**	**54.46**	**0.26400**	**1.55**	6.20	0.95
	283+00.00	57.82	0.12889	0.76	6.20	0.95
133	**282+00.00**	**61.19**	**0.26549**	**1.56**	6.20	0.95
	281+85.00	61.69	0.02116	0.12	6.20	0.95
131	**280+61.00**	**65.86**	**0.20270**	**1.19**	6.20	0.95
128	**280+11.00**	**67.54**	**0.15134**	**0.89**	6.20	0.95

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB99

STATION: 240+80

DRAINAGE AREA: 0.14Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	0.83	7.17

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.644	0.23	1.40

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	5.69	6.00	0.930	0.77	0.06
Reticuline	1.75	1.50	1.000	0.05	0.00
Combination			1.000	0.83	0.00

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB101

STATION: 238+50

DRAINAGE AREA: 0.26Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	1.53	9.39

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.515	0.27	1.59

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	8.11	6.00	0.760	1.17	0.36
Reticuline	1.75	1.50	0.870	0.31	0.05
Combination			0.967	1.48	0.05

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB104

STATION: 242+00

DRAINAGE AREA: 0.24Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.027	0.016	1.55	7.88

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.560	0.28	1.71

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	7.67	6.00	0.790	1.23	0.31
Reticuline	1.75	1.50	0.920	0.28	0.03
Combination			0.981	1.52	0.03

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB105

STATION: 244+00

DRAINAGE AREA: 0.31Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.005	0.027	0.016	1.99	8.35

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.533	0.30	1.97

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	9.30	6.00	0.690	1.38	0.61
Reticuline	1.75	1.50	0.820	0.50	0.11
Combination			0.945	1.88	0.11

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB107

STATION: 246+00

DRAINAGE AREA: 0.52Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.023	0.016	3.08	8.77

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.529	0.28	3.22

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	15.82	9.20	0.690	2.15	0.92
Reticuline	1.75	1.50	0.800	0.74	0.18
Combination			0.942	2.90	0.18

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB109

STATION: 248+70

DRAINAGE AREA: 0.04Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.020	0.016	0.47	3.08

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	N/A	0.962	0.15	2.77

INLET INTERCEPTION

Inlet Type	L (ft)	W (ft)	E	Qi (cfs)	Qb (cfs)
Reticuline	1.50	1.75	0.960	0.45	0.02

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB111

STATION: 250+25

DRAINAGE AREA: 0.51Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.020	0.016	3.11	8.75

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.549	0.26	3.70

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	18.01	9.20	0.630	1.97	1.13
Reticuline	1.75	1.50	0.790	0.89	0.24
Combination			0.923	2.87	0.24

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB112

STATION: 254+50

DRAINAGE AREA: 0.31Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.016	0.016	2.12	8.11

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.681	0.23	3.34

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	14.46	5.36	0.560	1.19	0.92
Reticuline	2.00	1.50	0.890	0.82	0.10
Combination			0.953	2.02	0.10

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB114

STATION: 257+00

DRAINAGE AREA: 0.87Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.022	0.023	0.016	5.10	9.85

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.538	0.32	4.21

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	22.38	10.72	0.690	3.52	1.57
Reticuline	2.00	1.50	0.800	1.25	0.32
Combination			0.937	4.78	0.32

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB116

STATION: 266+90

DRAINAGE AREA: 0.34Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.010	0.016	2.02	13.25

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.515	0.25	2.02

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	12.52	5.36	0.630	1.28	0.74
Reticuline	2.00	1.50	0.790	0.58	0.16
Combination			0.921	1.86	0.16

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB118

STATION: 269+00

DRAINAGE AREA: 0.26Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.020	0.016	1.67	7.01

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.721	0.24	2.83

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	11.11	4.00	0.550	0.92	0.74
Reticuline	2.00	1.50	0.910	0.67	0.06
Combination			0.964	1.61	0.06

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB121

STATION: 272+75

DRAINAGE AREA: 0.46Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.027	0.020	0.016	2.76	7.78

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
2.00	0.068	1.00	0.670	0.25	3.92

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Slotted Drain	16.93	5.36	0.490	1.36	1.39
Reticuline	2.00	1.50	0.820	1.14	0.25
Combination			0.909	2.51	0.25

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB122

STATION: 274+34

DRAINAGE AREA: 0.19Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.030	0.020	0.016	1.38	5.59

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.763	0.20	3.56

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	11.93	9.20	0.840	1.16	0.22
Reticuline	1.75	1.50	1.000	0.21	0.01
Combination			0.993	1.37	0.01

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB125

STATION: 277+75

DRAINAGE AREA: 0.61Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.016	0.020	0.016	3.60	10.06

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.485	0.28	3.30

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	18.11	15.60	0.930	3.36	0.24
Reticuline	1.75	1.50	0.990	0.23	0.00
Combination			1.000	3.60	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB127

STATION: 279+61

DRAINAGE AREA: 0.30Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.77	9.75

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.483	0.30	1.51

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	8.02	6.00	0.770	1.36	0.40
Reticuline	1.75	1.50	0.840	0.33	0.06
Combination			0.966	1.71	0.06

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB128

STATION: 280+11

DRAINAGE AREA: 0.15Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.023	0.115	0.016	1.75	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	W (ft)	T (ft)	d (ft)	Qi (cfs)
Reticuline	1.50	1.75	6.95	0.32	0.96

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB131

STATION: 280+61

DRAINAGE AREA: 0.20Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.24	8.39

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.550	0.27	1.39

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.55	5.42	0.800	0.99	0.25
Reticuline	1.75	1.50	0.920	0.23	0.01
Combination			0.992	1.23	0.01

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: FTG

DATE: 12-26-2000

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB133

STATION: 282+00

DRAINAGE AREA: 0.27Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.023	0.016	1.59	8.77

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.529	0.28	1.65

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	8.06	6.00	0.760	1.22	0.37
Reticuline	1.75	1.50	0.880	0.32	0.05
Combination			0.969	1.54	0.05

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: FTG

DATE: 01-03-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB135

STATION: 284+00

DRAINAGE AREA: 0.26Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.003	0.023	0.016	1.55	9.22

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.508	0.29	1.47

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	7.44	6.00	0.810	1.25	0.29
Reticuline	1.75	1.50	0.900	0.26	0.03
Combination			0.981	1.52	0.03

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: FTG

DATE: 01-03-2001

PROJECT: 43RD AVE & GRAND

PROJECT NO.: 24328

INLET NO.: CB136

STATION: 287+16

DRAINAGE AREA: 0.07Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.002	0.020	0.016	0.61	7.30

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.068	1.00	0.635	0.23	1.00

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	4.09	4.00	0.810	0.49	0.12
Reticuline	1.75	1.50	0.980	0.11	0.00
Combination			1.000	0.61	0.00

Calculations for Street Connectors
'43C', '43D', 'CA', 'CB'
10-year and 50-year Storms

Project: Street Connector 43C

Subject: Pavement Drainage Analysis

Filename: 43Connectors.xls

Computed By: GL Checked By: Date: Jan 5,2001

Baker

n = 0.016

10-year Computations

Inlet No.	Station	Q10 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (in)	V (fps)	Inlet Type	Grate L (ft)	Grate W (ft)	Curb Opening L (ft)
CB403	501+29.00	0.28	0.28	0.0038	0.0200	0.0670	7.00	4.07	1.00	0.28	0.00	0.28	1.92	1.16	Combination	3.00	1.75	7.50
CB400	503+75.00	0.75	0.75	0.0106	0.0122	0.0670	7.00	7.13	1.00	0.75	0.00	0.75	2.16	1.89	Combination	3.00	1.75	7.50
CB402	505+26.65	1.57	1.57	0.0000	0.0528	0.0670	7.00	6.49	1.00	1.57	0.00	1.57	3.96	NA	Combination	3.00	1.75	7.50
CB406	508+20.00	0.78	0.78	0.0153	0.0600	0.0670	7.00	2.96	1.00	0.78	0.00	0.78	2.28	2.83	Combination	3.00	1.75	7.50

50-year Computations

Inlet No.	Station	Q50 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (in)	V (fps)	Inlet Type	Grate L (ft)	Grate W (ft)	Curb Opening L (ft)
CB403	501+29.00	0.38	0.38	0.0038	0.0200	0.0670	14.00	4.88	1.00	0.38	0.01	0.39	2.16	1.22	Combination	3.00	1.75	7.50
CB400	503+75.00	1.04	1.05	0.0106	0.0122	0.0670	14.00	8.55	1.00	1.05	0.00	1.05	2.40	1.97	Combination	3.00	1.75	7.50
CB402	505+26.65	2.16	2.17	0.0000	0.0528	0.0670	14.00	8.05	1.00	2.17	0.00	2.17	4.44	NA	Combination	3.00	1.75	7.50
CB406	508+20.00	1.07	1.07	0.0153	0.0600	0.0670	14.00	3.34	0.99	1.06	0.01	1.07	2.52	3.05	Combination	3.00	1.75	7.50

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: GL

DATE: 01-04-2001

PROJECT: 43rd Ave _ 43C

PROJECT NO.: 24328

INLET NO.: CB403

STATION: 501+29

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	0.28	4.07

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.890	0.16	1.16

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	3.05	2.80	0.620	0.17	0.10
Reticuline	1.75	1.50	1.000	0.10	0.00
Combination			1.000	0.28	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: GL

DATE: 01-04-2001

PROJECT: 43rd Ave _ 43C

PROJECT NO.: 24328

INLET NO.: CB400

STATION: 503+75

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.011	0.012	0.016	0.75	7.13

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.722	0.18	1.89

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	7.05	6.00	0.830	0.62	0.12
Reticuline	1.75	1.50	1.000	0.11	0.00
Combination			1.000	0.75	0.00

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
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DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ 43C

PROJECT NO.: 24328

INLET NO.: CB402

STATION: 505+26.65

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.027	0.115	0.016	1.75	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	h (in) W (ft)	T (ft)	d (ft)	Qi (cfs)
Curb-Opening	6.00	8.00			
Reticuline	1.50	1.75			
Sweeper Combination			6.49	0.33	1.56

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ 43C

PROJECT NO.: 24328

INLET NO.: CB406

STATION: 508+20

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.060	0.016	0.78	2.96

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.913	0.19	2.83

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.92	6.00	0.840	0.66	0.11
Reticuline	1.75	1.50	1.000	0.10	0.00
Combination			1.000	0.78	0.00

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: GL

DATE: 01-04-2001

PROJECT: 43rd Ave _ 43C

PROJECT NO.: 24328

INLET NO.: CB403

STATION: 501+29

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.004	0.020	0.016	0.38	4.88

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.823	0.18	1.22

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	3.61	2.80	0.550	0.20	0.17
Reticuline	1.75	1.50	0.980	0.16	0.01
Combination			0.974	0.37	0.01

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: GL

DATE: 01-04-2001

PROJECT: 43rd Ave _ 43C

PROJECT NO.: 24328

INLET NO.: CB400

STATION: 503+75

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.011	0.012	0.016	1.05	8.55

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.632	0.20	1.97

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	8.72	6.00	0.720	0.76	0.28
Reticuline	1.75	1.50	0.960	0.27	0.00
Combination			1.000	1.05	0.00

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ 43C

PROJECT NO.: 24328

INLET NO.: CB402

STATION: 505+26.65

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.027	0.115	0.016	1.75	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	h (in) W (ft)	T (ft)	d (ft)	Qi (cfs)
Curb-Opening	6.00	8.00			
Reticuline	1.50	1.75			
Sweeper Combination			8.05	0.37	2.16

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ 43C

PROJECT NO.: 24328

INLET NO.: CB406

STATION: 508+20

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.015	0.060	0.016	1.07	3.34

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.867	0.21	3.05

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	8.02	6.00	0.770	0.82	0.25
Reticuline	1.75	1.50	0.990	0.24	0.01
Combination			0.991	1.06	0.01

Project: Street Connector 43D
Subject: Pavement Drainage Analysis

Filenam 43Conectors.xls

Computed By: GL **Checked By:** **Date:** Jan 5,2001

Baker

n = 0.016

10-year Computations

Inlet No.	Station	Q10 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (in)	V (fps)	Inlet Type	Grate L (ft)	Grate W (ft)	Curb Opening L (ft)
CB401	**603+59.00**	1.36	1.36	0.0235	0.0600	0.0670	6.74	3.39	1.00	1.36	0.00	1.36	2.64	3.81	Combination	3.00	1.75	7.50
CB404	**601+54.69**	0.77	0.77	0.0000	0.0200	0.0670	7.00	5.50	1.00	0.77	0.00	0.77	3.36	NA	Combination	3.00	1.75	7.50

50-year Computations

Inlet No.	Station	Q50 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (in)	V (fps)	Inlet Type	Grate L (ft)	Grate W (ft)	Curb Opening L (ft)
CB401	**603+59.00**	1.88	1.88	0.0235	0.0600	0.0670	13.48	3.83	0.97	1.83	0.05	1.88	2.88	4.13	Combination	3.00	1.75	7.50
CB404	**601+54.69**	1.06	1.11	0.0000	0.0200	0.0670	14.00	7.03	1.00	1.11	0.00	1.11	3.72	NA	Combination	3.00	1.75	7.50

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
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DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave - 43D

PROJECT NO.: 24328

INLET NO.: CB404

STATION:

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.020	0.115	0.016	1.75	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	h (in) W (ft)	T (ft)	d (ft)	Qi (cfs)
Curb-Opening	6.00	8.00			
Reticuline	1.50	1.75			
Sweeper Combination			5.50	0.28	0.76

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ 43D

PROJECT NO.: 24328

INLET NO.: CB401

STATION: 603+59

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.060	0.016	1.36	3.39

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.864	0.22	3.81

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	10.10	6.00	0.650	0.88	0.48
Reticuline	1.75	1.50	0.980	0.47	0.00
Combination			1.000	1.36	0.00

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave - 43D

PROJECT NO.: 24328

INLET NO.: CB404

STATION: 601+54.69

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.020	0.115	0.016	1.75	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	h (in) W (ft)	T (ft)	d (ft)	Qi (cfs)
Curb-Opening	6.00	8.00			
Reticuline	1.50	1.75			
Sweeper Combination			7.03	0.31	1.10

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
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DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ 43D

PROJECT NO.: 24328

INLET NO.: CB401

STATION: 603+59

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.023	0.060	0.016	1.88	3.83

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.810	0.24	4.13

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	11.77	6.00	0.570	1.08	0.79
Reticuline	1.75	1.50	0.940	0.74	0.05
Combination			0.973	1.83	0.05

Project: Street Connector CA

Subject: Pavement Drainage Analysis

Filenam 43Connectors.xls

Computed By: GL Checked By: Date: Jan 5,2001

Baker

n = 0.016

10-year Computations

Inlet No.	Station	Q10 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (in)	V (fps)	Inlet Type	Grate L (ft)	Grate W (ft)	Curb Opening L (ft)
CB300	310+50.00	0.26	0.26	0.0071	0.0089	0.0670	5.33	4.59	1.00	0.26	0.00	0.26	1.68	1.41	Combination	3.00	1.75	3.50
CB301	315+68.57	1.44	1.44	0.0000	0.0180	0.0670	7.00	5.75	1.00	1.44	0.00	1.44	3.24	NA	Combination	3.00	1.75	19.50

50-year Computations

Inlet No.	Station	Q50 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (in)	V (fps)	Inlet Type	Grate L (ft)	Grate W (ft)	Curb Opening L (ft)
CB300	310+50.00	0.35	0.35	0.0071	0.0089	0.0670	10.67	5.96	0.97	0.34	0.01	0.35	1.80	1.40	Combination	3.00	1.75	3.50
CB301	315+68.57	1.98	1.99	0.0000	0.0180	0.0670	14.00	7.14	1.00	1.99	0.00	1.99	3.60	NA	Combination	3.00	1.75	19.50

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*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CA

PROJECT NO.: 24328

INLET NO.: CB300

STATION: 310+50

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.007	0.009	0.016	0.26	4.59

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.929	0.14	1.41

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	3.51	2.80	0.560	0.14	0.11
Reticuline	1.75	1.50	1.000	0.10	0.00
Combination			1.000	0.26	0.00

```
*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CA

PROJECT NO.: 24328

INLET NO.: CB301

STATION: 315+68.57

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.018	0.115	0.016	1.75	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	h (in) W (ft)	T (ft)	d (ft)	Qi (cfs)
Curb-Opening	15.60	8.00			
Reticuline	1.50	1.75			
Sweeper Combination			5.75	0.27	1.43

```
*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CA

PROJECT NO.: 24328

INLET NO.: Cb300

STATION: 310+50

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.007	0.009	0.016	0.35	5.96

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.848	0.15	1.40

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	4.19	2.80	0.480	0.17	0.17
Reticuline	1.75	1.50	0.990	0.16	0.01
Combination			0.971	0.34	0.01

```
*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CA

PROJECT NO.: 24328

INLET NO.: CB301

STATION: 315+68.57

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	Sx (ft/ft)	Sw (ft/ft)	n	W (ft)	a (in)
Composite/dep	0.018	0.115	0.016	1.75	1.00

INLET INTERCEPTION

Inlet Type * Sag *	L (ft)	h (in) W (ft)	T (ft)	d (ft)	Qi (cfs)
Curb-Opening	15.60	8.00			
Reticuline	1.50	1.75			
Sweeper Combination			7.14	0.30	1.98

Project: Street Connector CB
Subject: Pavement Drainage Analysis

Baker

Filenam 43Connectors.xls
Computed By: GL Checked By: Date: Jan 5,2001

n = 0.016

10-year Computations

Right

Inlet No.	Station	Q10 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (in)	V (fps)	Inlet Type	Grate L (ft)	Grate W (ft)	Curb Opening L (ft)
CB202	410+00.00	0.70	0.70	0.0088	0.0445	0.0670	7.00	3.59	0.96	0.67	0.03	0.70	2.40	2.16	Combination	3.00	1.75	3.50
CB201	412+73.28	0.79	0.82	0.0088	0.0200	0.0670	7.00	5.88	1.00	0.82	0.00	0.82	2.40	1.95	Combination	3.00	1.75	7.50
	Left																	
Cb200	412+73.28	0.50	0.50	0.0088	0.0200	0.0670	6.50	4.48	0.96	0.48	0.02	0.50	2.04	1.82	Combination	3.00	1.75	3.50

50-year Computations

Right

Inlet No.	Station	Q50 (cfs)	Qinlet (cfs)	So ('/ft)	Sx ('/ft)	Sw ('/ft)	Spread Allow (ft)	Spread Calc (ft)	E	Qi (cfs)	Qb (cfs)	Qtot (cfs)	Depth (in)	V (fps)	Inlet Type	Grate L (ft)	Grate W (ft)	Curb Opening L (ft)
CB202	410+00.00	0.96	0.96	0.0088	0.0445	0.0670	14.00	4.11	0.94	0.90	0.06	0.96	2.64	2.30	Combination	3.00	1.75	3.50
CB201	412+73.28	1.08	1.14	0.0088	0.0200	0.0670	14.00	6.92	0.99	1.13	0.01	1.14	2.64	2.05	Combination	3.00	1.75	7.50
	Left																	
CB200	412+73.28	0.69	0.69	0.0088	0.0200	0.0670	13.00	5.38	0.93	0.64	0.05	0.69	2.28	1.89	Combination	3.00	1.75	3.50

```
*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CB

PROJECT NO.: 24328

INLET NO.: CB202

STATION: 410+00

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.045	0.016	0.70	3.59

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.864	0.20	2.16

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	5.76	2.80	0.360	0.25	0.44
Reticuline	1.75	1.50	0.940	0.41	0.03
Combination			0.957	0.67	0.03

```
*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CB

PROJECT NO.: 24328

INLET NO.: CB201

STATION: 412+73.28

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.020	0.016	0.82	5.88

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.739	0.20	1.95

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.76	6.00	0.860	0.70	0.12
Reticuline	1.75	1.50	1.000	0.11	0.00
Combination			1.000	0.82	0.00

```
*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CB

PROJECT NO.: 24328

INLET NO.: CB200

STATION: 412+73.28

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 10 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.020	0.016	0.50	4.48

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.856	0.17	1.82

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	5.11	2.80	0.400	0.20	0.30
Reticuline	1.75	1.50	0.960	0.28	0.02
Combination			0.960	0.48	0.02

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*************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CB

PROJECT NO.: 24328

INLET NO.: CB202

STATION: 410+00

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.045	0.016	0.96	4.11

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.806	0.22	2.30

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.73	2.80	0.310	0.30	0.65
Reticuline	1.75	1.50	0.890	0.58	0.06
Combination			0.938	0.90	0.06

```
*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CB

PROJECT NO.: 24328

INLET NO.: CB201

STATION: 412+73.28

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.020	0.016	1.14	6.92

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.660	0.22	2.05

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	8.18	6.00	0.760	0.86	0.27
Reticuline	1.75	1.50	0.970	0.26	0.01
Combination			0.991	1.13	0.01

```
*****************************************************
*****   FHWA URBAN DRAINAGE DESIGN PROGRAMS   *****
*****          ROADWAY DRAINAGE DESIGN        *****
*****************************************************
```

DESIGNER: GL

DATE: 01-05-2001

PROJECT: 43rd Ave _ CB

PROJECT NO.: 24328

INLET NO.: CB200

STATION: 412+73.28

DRAINAGE AREA: Acres

DESIGN FREQUENCY: 50 Years

ROADWAY & DISCHARGE DATA

Cross-Slope	S (ft/ft)	Sx (ft/ft)	n	Q (cfs)	T (ft)
Composite	0.009	0.020	0.016	0.69	5.38

GUTTER FLOW

W (ft)	Sw (ft/ft)	a (in)	Eo	d (ft)	V (fps)
1.75	0.067	1.00	0.781	0.19	1.89

INLET INTERCEPTION

Inlet Type	LT or W (ft)	L (ft)	E	Qi (cfs)	Qb (cfs)
Curb-Opening	6.13	2.80	0.340	0.24	0.44
Reticuline	1.75	1.50	0.890	0.39	0.05
Combination			0.928	0.64	0.05

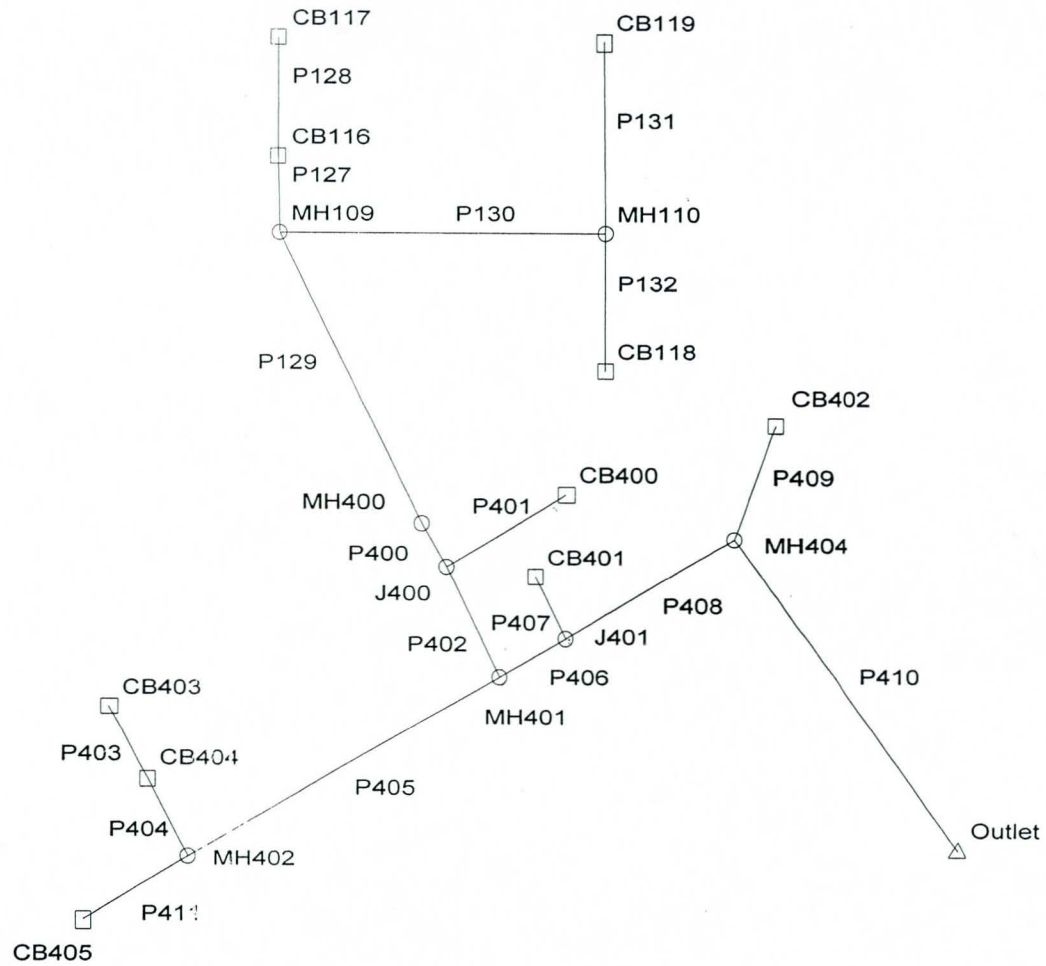
APPENDIX D
Proposed Storm Drain System

1. Grand Avenue Northside of Overpass and Connectors 43C and 43D
   a) Storm Drain Layout
   b) Pipe/Node Report
2. Grand Avenue Southside of Overpass
   a) Storm Drain Layout
   b) Pipe/Node Report
3. Street Connector CB
   a) Storm Drain Layout
   b) Pipe/Node Report

Grand Avenue Storm Drain (Sta 266+90 to 269+00)

NORTH SIDE OF GRAND

Connects 43C & 43D



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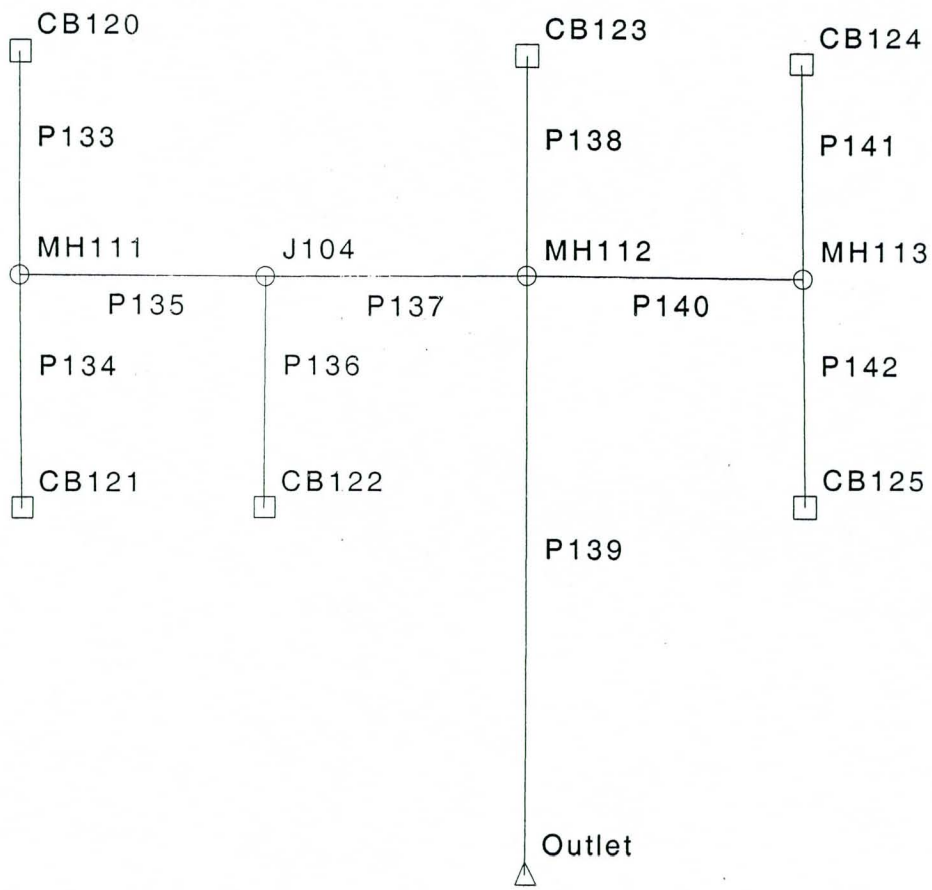
Project Engineer: Frank Gestring
StormCAD v1.5 [158]
Page 1 of 1

Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Section Size	Capacity (cfs)	Discharge (cfs)	Average Velocity (ft/s)	Upstream Ground Elevation (ft)	Upstream Invert Elevation (ft)	Upstream HGL (ft)	Downstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Downstream HGL (ft)	Constructed Slope (ft/ft)
P128	CB117	CB116	56.00	18 inch	14.59	1.51	2.27	1,169.73	1,165.23	1,165.69	1,170.01	1,164.15	1,165.11	0.019286
P131	CB119	MH110	62.00	18 inch	13.14	1.13	3.78	1,165.97	1,161.47	1,161.87	1,167.95	1,160.50	1,160.80	0.015645
P132	CB118	MH110	42.00	18 inch	13.66	1.15	3.86	1,167.21	1,162.71	1,163.11	1,167.95	1,162.00	1,162.29	0.016905
P127	CB116	MH109	6.00	18 inch	16.61	2.99	4.80	1,170.01	1,164.15	1,164.81	1,170.07	1,164.00	1,164.51	0.025000
P130	MH110	MH109	210.00	24 inch	10.12	2.28	3.03	1,167.95	1,160.00	1,160.65	1,170.07	1,159.58	1,160.10	0.002000
P129	MH109	MH400	170.00	24 inch	84.37	5.27	3.49	1,170.07	1,155.58	1,156.39	1,139.50	1,131.93	1,133.17	0.139118
P403	CB403	CB404	71.00	18 inch	10.43	0.28	1.18	1,141.03	1,136.50	1,136.70	1,141.70	1,135.80	1,136.63	0.009859
P400	MH400	J400	25.00	24 inch	16.31	5.27	2.59	1,139.50	1,131.93	1,133.10	1,137.60	1,131.80	1,133.10	0.005200
P401	CB400	J400	56.00	18 inch	7.69	0.75	0.71	1,136.85	1,132.35	1,133.10	1,137.60	1,132.05	1,133.10	0.005357
P404	CB404	MH402	48.00	18 inch	10.72	2.28	4.26	1,141.70	1,135.80	1,136.37	1,141.00	1,135.30	1,135.77	0.010417
P411	CB405	MH402	95.00	18 inch	15.98	2.00	4.86	1,142.00	1,137.50	1,138.03	1,141.00	1,135.30	1,135.66	0.023158
P402	J400	MH401	101.00	24 inch	15.92	6.02	2.65	1,137.60	1,131.80	1,132.98	1,140.00	1,131.30	1,132.95	0.004950
P405	MH402	MH401	189.00	24 inch	30.78	4.28	2.85	1,141.00	1,134.80	1,135.53	1,140.00	1,131.30	1,132.95	0.018519
P407	CB401	J401	39.00	18 inch	45.44	1.57	2.11	1,143.13	1,138.60	1,139.07	1,140.00	1,131.30	1,132.71	0.187179
P406	MH401	J401	37.00	24 inch	18.59	10.30	4.01	1,140.00	1,131.30	1,132.72	1,140.00	1,131.05	1,132.71	0.006757
P408	J401	MH404	93.00	24 inch	24.04	11.87	4.80	1,140.00	1,131.05	1,132.29	1,147.23	1,130.00	1,132.14	0.011290
P409	CB402	MH404	95.00	18 inch	6.82	2.00	1.19	1,135.41	1,130.90	1,132.17	1,147.23	1,130.50	1,132.14	0.004211
P410	MH404	Outlet	170.00	24 inch	10.26	13.87	5.35	1,147.23	1,130.00	1,131.89	1,142.00	1,129.65	1,130.99	0.002059

Grand Avenue Storm Drain (Sta 272+75 to Sta 277+75)

NORTHSIDE OF GRAND



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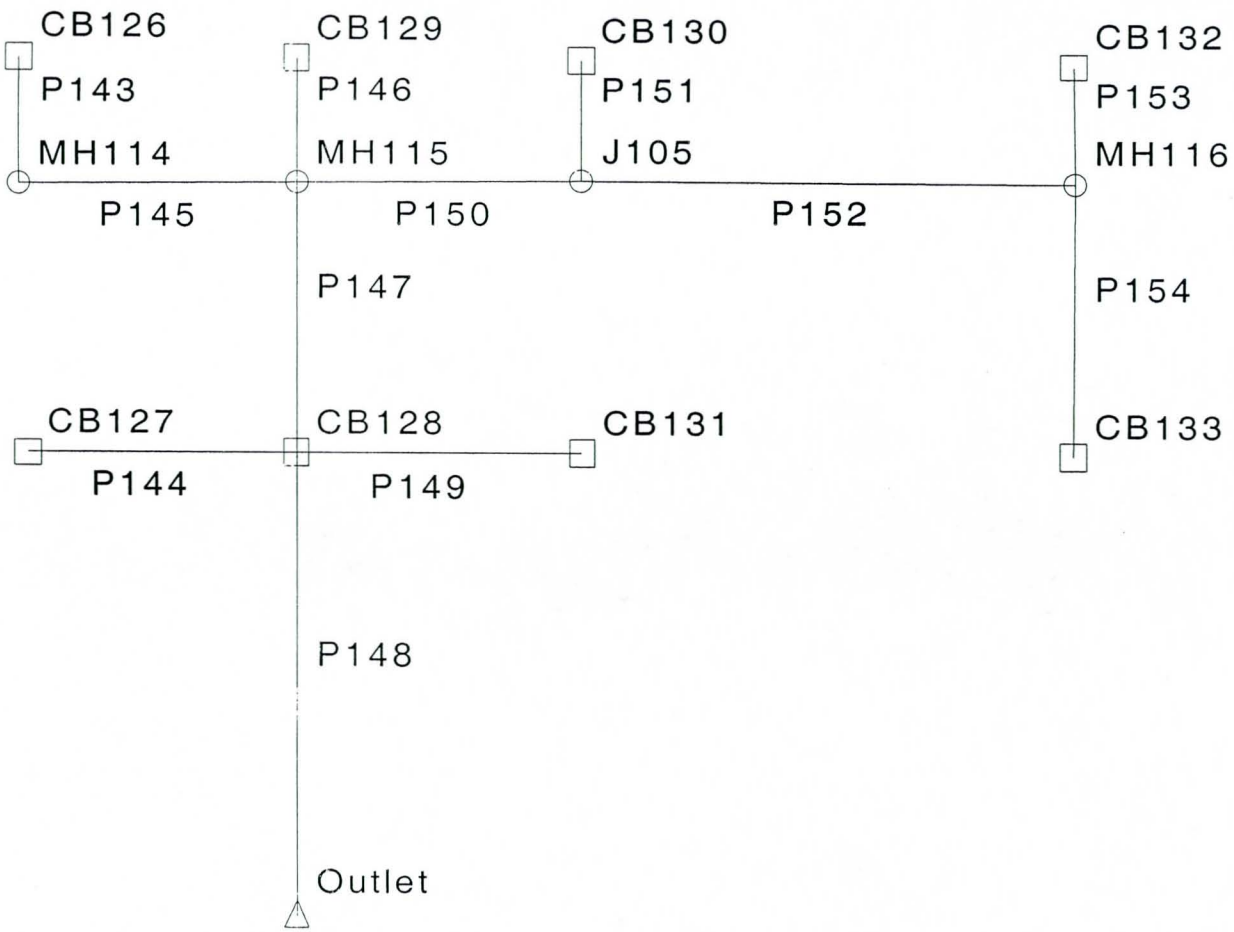
Project Engineer: Frank Gestring
StormCAD v1.5 [158]
Page 1 of 1

Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Section Size	Capacity (cfs)	Discharge (cfs)	Average Velocity (ft/s)	Upstream Ground Elevation (ft)	Upstream Invert Elevation (ft)	Upstream HGL (ft)	Downstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Downstream HGL (ft)	Constructed Slope (ft/ft)
P134	CB121	MH111	42.00	18 inch	14.22	1.96	4.59	1,159.27	1,154.77	1,155.30	1,160.01	1,154.00	1,154.38	0.018333
P133	CB120	MH111	62.00	18 inch	11.71	1.96	4.22	1,159.27	1,154.77	1,155.30	1,160.01	1,154.00	1,154.42	0.012419
P136	CB122	J104	42.00	18 inch	14.04	0.91	1.99	1,154.65	1,150.15	1,150.51	1,155.39	1,149.40	1,150.10	0.017857
P135	MH111	J104	159.00	24 inch	37.42	3.92	3.36	1,160.01	1,153.50	1,154.19	1,155.39	1,149.15	1,150.10	0.027358
P141	CB124	MH113	85.00	18 inch	12.64	1.61	2.12	1,146.18	1,141.68	1,142.16	1,146.56	1,140.45	1,142.09	0.014471
P142	CB125	MH113	59.00	18 inch	10.05	2.61	1.66	1,145.49	1,140.99	1,142.11	1,146.56	1,140.45	1,142.09	0.009153
P137	J104	MH112	151.00	24 inch	37.30	4.83	6.26	1,155.39	1,149.15	1,149.92	1,150.86	1,145.00	1,145.48	0.027483
P138	CB123	MH112	62.00	18 inch	11.16	1.63	3.93	1,150.20	1,145.70	1,146.18	1,150.86	1,145.00	1,145.39	0.011290
P140	MH113	MH112	190.00	24 inch	10.38	4.22	1.34	1,146.56	1,139.95	1,142.07	1,150.86	1,139.55	1,142.00	0.002105
P139	MH112	Outlet	145.00	24 inch	11.11	10.68	3.40	1,150.86	1,139.55	1,141.82	1,143.00	1,139.20	1,141.50	0.002414

Grand Avenue Storm Drain (279+61 to 282+00)

NORTH SIDE OF GRAND



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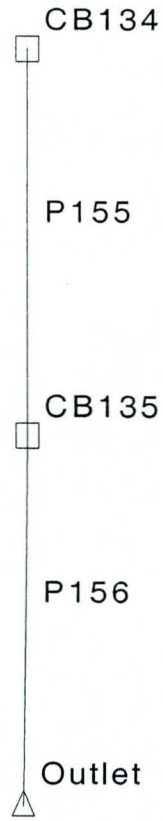
Project Engineer: Frank Gestring
StormCAD v1.5 [158]
Page 1 of 1

Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Section Size	Capacity (cfs)	Discharge (cfs)	Average Velocity (ft/s)	Upstream Ground Elevation (ft)	Upstream Invert Elevation (ft)	Upstream HGL (ft)	Downstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Downstream HGL (ft)	Constructed Slope (ft/ft)
P154	CB133	MH116	46.00	18 inch	11.17	1.13	3.54	1,144.37	1,139.87	1,140.27	1,145.32	1,139.35	1,139.67	0.011304
P153	CB132	MH116	14.00	18 inch	23.65	0.88	4.44	1,144.56	1,140.06	1,140.41	1,145.32	1,139.35	1,139.55	0.050714
P152	MH116	J105	139.00	24 inch	16.05	2.01	2.19	1,145.32	1,138.85	1,139.34	1,144.78	1,138.15	1,139.35	0.005036
P151	CB130	J105	14.00	18 inch	28.21	0.65	1.57	1,143.91	1,139.41	1,139.71	1,144.78	1,138.40	1,139.35	0.072143
P143	CB126	MH114	14.00	18 inch	26.78	1.19	2.24	1,144.01	1,139.51	1,139.92	1,144.78	1,138.60	1,139.32	0.065000
P146	CB129	MH115	14.00	18 inch	17.98	1.13	4.16	1,143.91	1,139.41	1,139.81	1,144.69	1,139.00	1,139.27	0.029286
P150	J105	MH115	50.00	24 inch	16.00	2.66	1.26	1,144.78	1,138.15	1,139.32	1,144.69	1,137.90	1,139.32	0.005000
P145	MH114	MH115	50.00	24 inch	14.31	1.19	0.55	1,144.78	1,138.10	1,139.32	1,144.69	1,137.90	1,139.32	0.004000
P144	CB127	CB128	50.00	18 inch	14.55	1.29	2.04	1,143.61	1,139.11	1,139.54	1,143.59	1,138.15	1,139.23	0.019200
P149	CB131	CB128	50.00	18 inch	15.08	0.88	1.73	1,143.68	1,139.18	1,139.53	1,143.59	1,138.15	1,139.23	0.020600
P147	MH115	CB128	50.00	24 inch	16.00	4.98	2.05	1,144.69	1,137.90	1,139.24	1,143.59	1,137.65	1,139.23	0.005000
P148	CB128	Outlet	58.00	24 inch	13.28	7.81	3.26	1,143.59	1,137.65	1,139.01	1,144.00	1,137.45	1,138.95	0.003448

Grand Avenue Storm Drain (Sta 284+00)

NORTH SIDE OF GRAND



Project Title: 43rd Avenue and Grand Avenue
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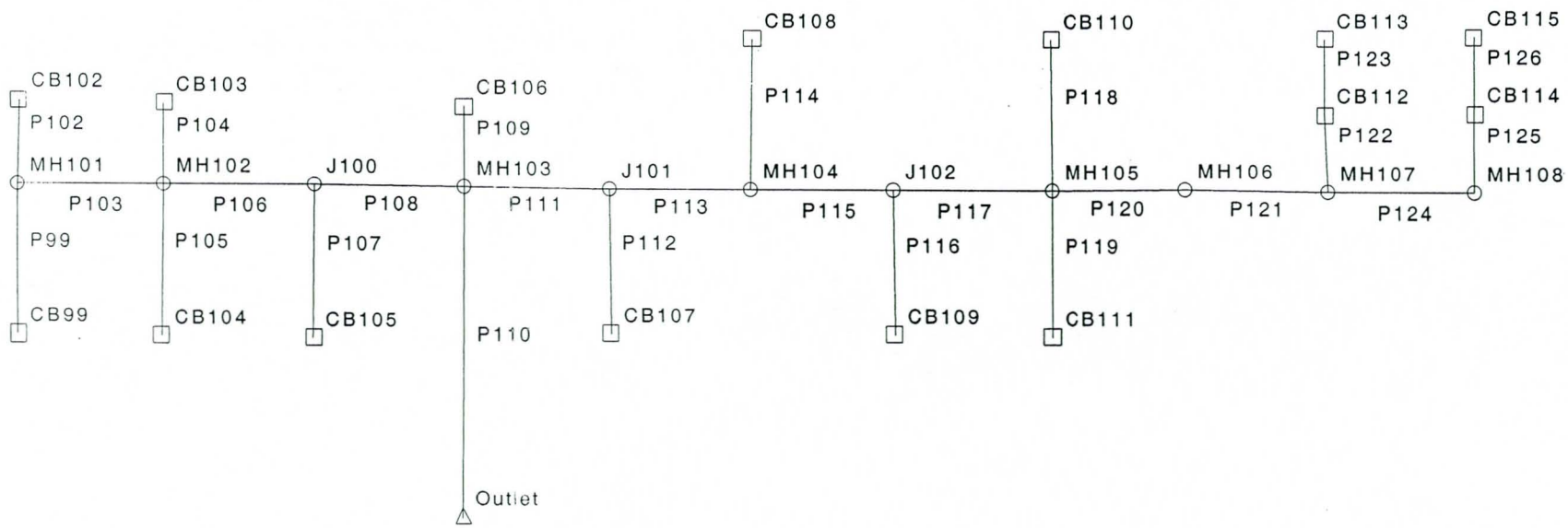
MICHAEL BAKER JR. INC
© Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Project Engineer: Frank Gestring
StormCAD v1.5 [158]

Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Section Size	Capacity (cfs)	Discharge (cfs)	Average Velocity (ft/s)	Upstream Ground Elevation (ft)	Upstream Invert Elevation (ft)	Upstream HGL (ft)	Downstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Downstream HGL (ft)	Constructed Slope (ft/ft)
P155	CB134	CB135	48.00	18 inch	7.43	1.37	1.86	1,145.24	1,140.74	1,141.30	1,145.20	1,140.50	1,141.30	0.005000
P156	CB135	Outlet	145.00	24 inch	9.39	2.50	1.09	1,145.20	1,140.00	1,141.27	1,145.30	1,139.75	1,141.25	0.001724

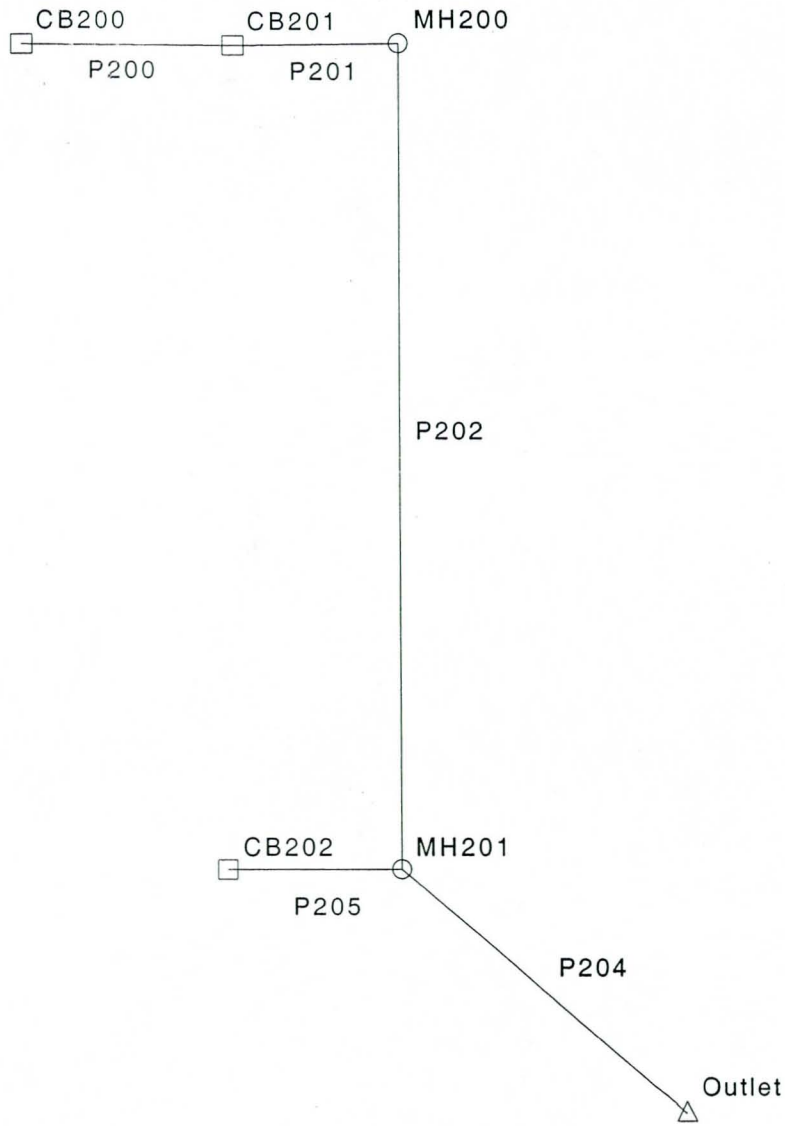
Grand Avenue Storm Drain (Sta 240+80 to Sta 257+00)
SOUTHSIDE OF GRAND



Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Section Size	Capacity (cfs)	Discharge (cfs)	Average Velocity (ft/s)	Upstream Ground Elevation (ft)	Upstream Invert Elevation (ft)	Upstream HGL (ft)	Downstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Downstream HGL (ft)	Constructed Slope (ft/ft)
P126	CB115	CB114	52.00	18 inch	10.90	3.70	2.38	1,163.06	1,158.56	1,159.66	1,163.24	1,158.00	1,159.63	0.010769
P123	CB113	CB112	52.00	18 inch	10.60	1.65	2.37	1,157.43	1,152.93	1,153.41	1,157.62	1,152.40	1,153.36	0.010192
P125	CB114	MH108	6.00	18 inch	16.61	7.40	6.28	1,163.24	1,158.00	1,159.05	1,163.30	1,157.85	1,158.72	0.025000
P122	CB112	MH107	6.00	18 inch	16.61	3.00	3.38	1,157.62	1,152.40	1,153.06	1,157.68	1,152.25	1,153.14	0.025000
P124	MH108	MH107	250.00	24 inch	33.86	7.40	4.04	1,163.30	1,157.35	1,158.32	1,157.68	1,151.75	1,153.14	0.022400
P121	MH107	MH106	212.00	24 inch	33.86	10.40	4.99	1,157.68	1,151.75	1,152.91	1,153.23	1,147.00	1,148.39	0.022406
P120	MH106	MH105	213.00	24 inch	33.78	10.40	4.42	1,153.23	1,147.00	1,148.16	1,148.41	1,142.25	1,144.26	0.022300
P119	CB111	MH105	38.00	18 inch	11.17	2.18	1.41	1,147.68	1,143.18	1,144.26	1,148.41	1,142.75	1,144.26	0.011316
P118	CB110	MH105	58.00	18 inch	12.18	2.18	2.02	1,148.03	1,143.53	1,144.21	1,148.41	1,142.75	1,144.26	0.013448
P116	CB109	J102	38.00	18 inch	13.84	0.21	0.17	1,144.16	1,139.66	1,140.46	1,144.91	1,139.00	1,140.46	0.017368
P117	MH105	J102	155.00	24 inch	33.99	14.76	5.76	1,148.41	1,142.25	1,143.63	1,144.91	1,138.75	1,140.46	0.022581
P99	CB99	MH101	30.00	18 inch	9.20	0.58	0.46	1,135.54	1,131.00	1,131.90	1,136.18	1,130.77	1,131.90	0.007667
P102	CB102	MH101	14.00	18 inch	13.46	0.96	0.77	1,135.37	1,131.00	1,131.90	1,136.18	1,130.77	1,131.90	0.016429
P114	CB108	MH104	78.00	18 inch	10.70	2.25	2.51	1,142.56	1,138.06	1,138.63	1,143.30	1,137.25	1,138.61	0.010385
P115	J102	MH104	70.00	24 inch	38.24	14.97	5.66	1,144.91	1,138.75	1,140.14	1,143.30	1,136.75	1,138.61	0.028571
P104	CB103	MH102	14.00	18 inch	25.73	1.44	2.04	1,135.87	1,131.37	1,131.82	1,136.75	1,130.53	1,131.89	0.060000
P103	MH101	MH102	120.00	24 inch	10.12	1.54	0.53	1,136.18	1,130.27	1,131.90	1,136.75	1,130.03	1,131.89	0.002000
P105	CB104	MH102	30.00	18 inch	18.39	1.06	1.80	1,135.95	1,131.45	1,131.83	1,136.75	1,130.53	1,131.89	0.030667
P112	CB107	J101	54.00	18 inch	12.78	2.22	1.58	1,138.25	1,133.75	1,134.69	1,139.05	1,132.95	1,134.70	0.014815
P113	MH104	J101	200.00	24 inch	32.19	17.22	6.16	1,143.30	1,136.75	1,138.25	1,139.05	1,132.70	1,134.70	0.020250
P107	CB105	J100	43.00	18 inch	23.21	1.34	1.96	1,136.48	1,131.98	1,132.41	1,137.57	1,129.88	1,131.81	0.048837
P106	MH102	J100	200.00	24 inch	10.12	4.04	1.31	1,136.75	1,130.03	1,131.87	1,137.57	1,129.63	1,131.81	0.002000
P111	J101	MH103	100.00	24 inch	40.91	19.44	6.73	1,139.05	1,132.70	1,134.29	1,138.32	1,129.43	1,131.71	0.032700
P109	CB106	MH103	14.00	18 inch	27.07	1.99	5.69	1,137.43	1,132.93	1,133.46	1,138.32	1,132.00	1,132.30	0.066429
P108	J100	MH103	100.00	24 inch	10.12	5.38	1.71	1,137.57	1,129.63	1,131.76	1,138.32	1,129.43	1,131.71	0.002000
P110	MH103	Outlet	126.00	30 inch	20.99	26.81	6.49	1,138.32	1,128.93	1,131.19	1,137.50	1,128.60	1,130.37	0.002619

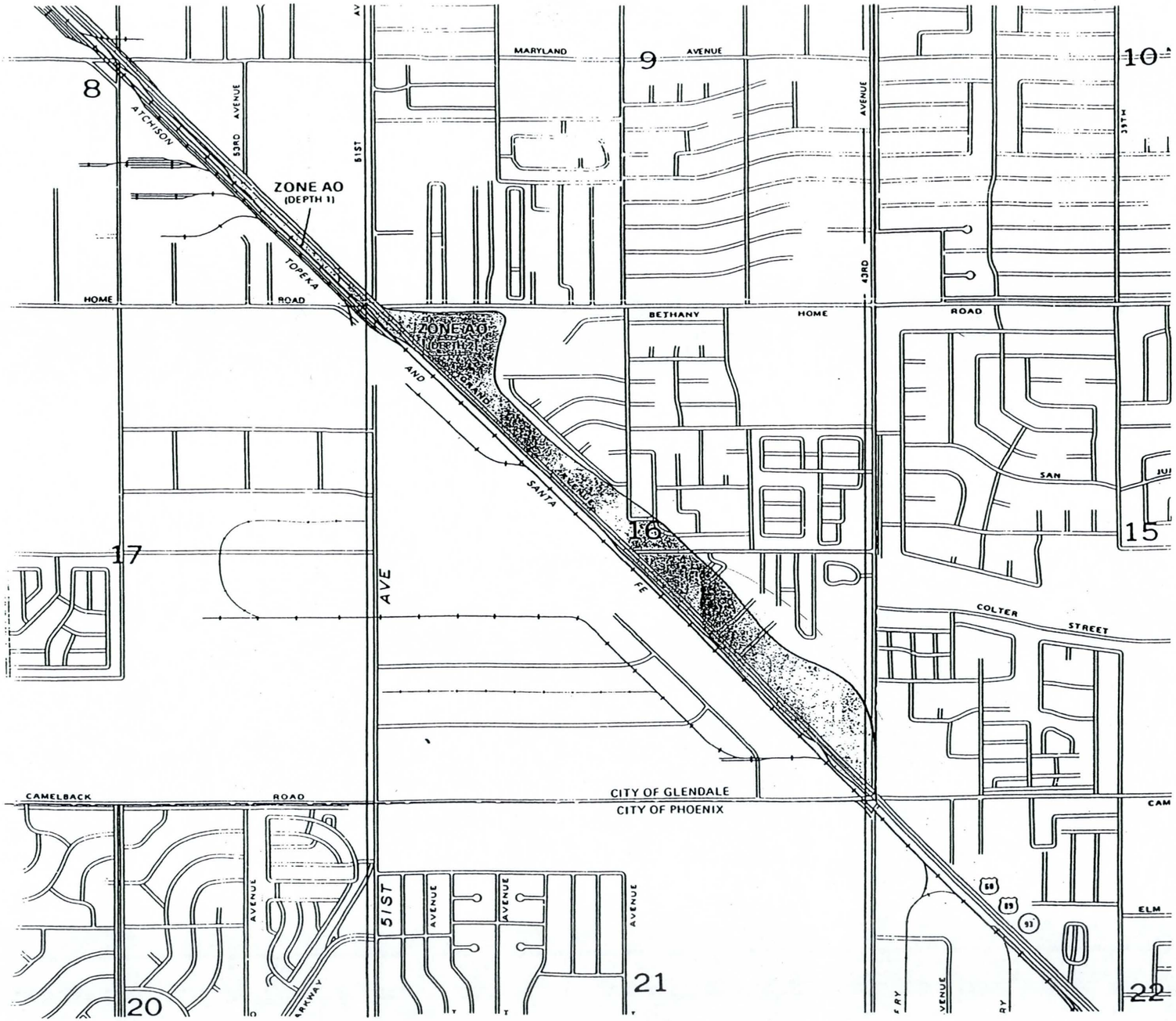
CONNECTOR CB



Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Section Size	Capacity (cfs)	Discharge (cfs)	Average Velocity (ft/s)	Upstream Ground Elevation (ft)	Upstream Invert Elevation (ft)	Upstream HGL (ft)	Downstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Downstream HGL (ft)	Constructed Slope (ft/ft)
P200	CB200	CB201	50.00	18 inch	11.21	0.50	2.81	1,140.90	1,136.40	1,136.66	1,141.80	1,135.83	1,136.05	0.011400
P201	CB201	MH200	30.00	24 inch	23.73	1.32	2.54	1,141.80	1,135.33	1,135.73	1,140.25	1,135.00	1,135.51	0.011000
P205	CB202	MH201	30.00	18 inch	55.91	0.70	6.76	1,145.62	1,141.60	1,141.91	1,138.50	1,133.10	1,133.22	0.283333
P202	MH200	MH201	276.00	24 inch	21.09	1.32	2.33	1,140.25	1,135.00	1,135.40	1,138.50	1,132.60	1,133.20	0.008696
P204	MH201	Outlet	110.00	24 inch	21.02	2.02	2.08	1,138.50	1,132.60	1,133.09	1,138.00	1,131.65	1,133.15	0.008636

APPENDIX E
FEMA Flood Insurance Rate Map



APPROXIMATE SCALE IN FEET

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NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1645 OF 4350

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
GLENDALE, CITY OF	040045	1645	E
PHOENIX, CITY OF	040051	1645	E

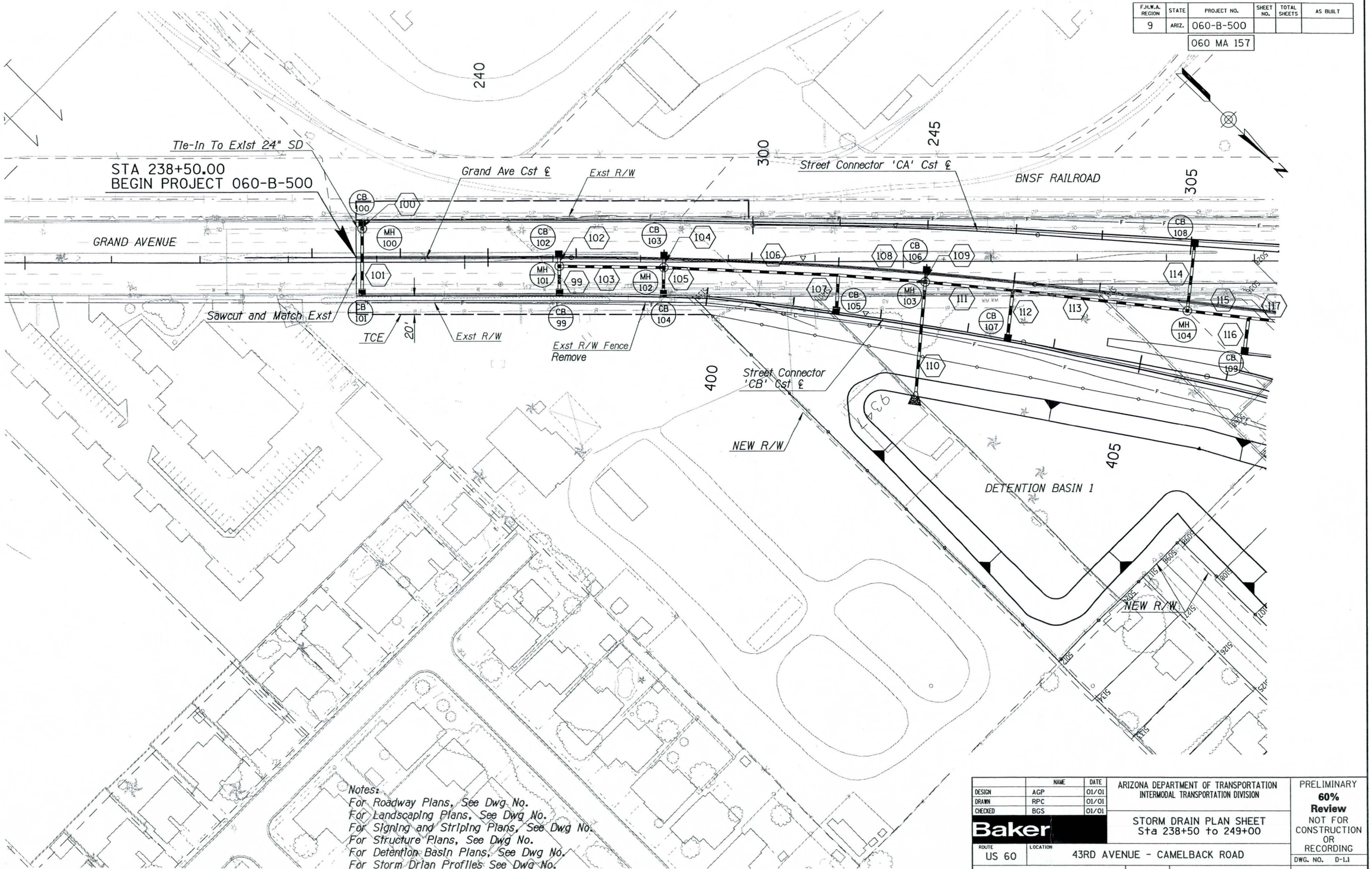
MAP NUMBER
04013C1645 E

MAP REVISED:
SEPTEMBER 30, 1995

Federal Emergency Management Agency

APPENDIX F
Roadway Construction Plans

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	060-B-500			
		060 MA 157			



Notes:
For Roadway Plans, See Dwg No.
For Landscaping Plans, See Dwg No.
For Signing and Striping Plans, See Dwg No.
For Structure Plans, See Dwg No.
For Detention Basin Plans, See Dwg No.
For Storm Drian Profiles See Dwg No.

	NAME	DATE
DESIGN	AGP	01/01
DRAWN	RPC	01/01
CHECKED	BGS	01/01

Baker

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

STORM DRAIN PLAN SHEET
Sta 238+50 to 249+00

ROUTE: US 60
LOCATION: 43RD AVENUE - CAMELBACK ROAD

TRACS NO. H 5532 01C
060-B-500

PRELIMINARY
60% Review
NOT FOR CONSTRUCTION OR RECORDING

DWG. NO. D-1.1
___ OF ___

DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.

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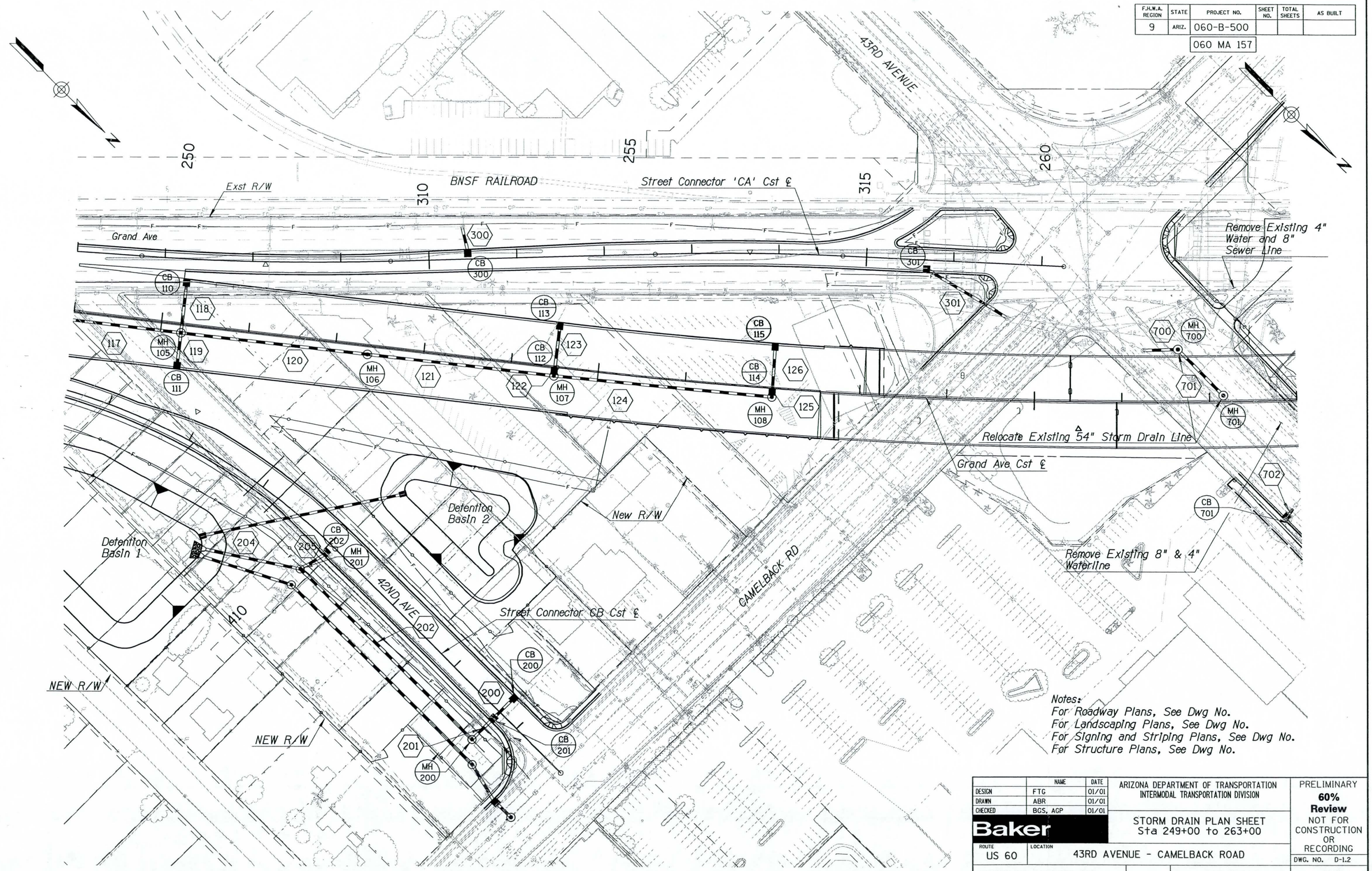
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	060-B-500			

060 MA 157



Notes:
For Roadway Plans, See Dwg No.
For Landscaping Plans, See Dwg No.
For Signing and Striping Plans, See Dwg No.
For Structure Plans, See Dwg No.

	NAME	DATE
DESIGN	FTG	01/01
DRAWN	ABR	01/01
CHECKED	BGS, AGP	01/01

Baker

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

STORM DRAIN PLAN SHEET
Sta 249+00 to 263+00

ROUTE: US 60
LOCATION: 43RD AVENUE - CAMELBACK ROAD

TRACS NO. H 5532 01C
060-B-500

PRELIMINARY
60% Review
NOT FOR CONSTRUCTION OR RECORDING

DWG. NO. D-1.2
___ OF ___

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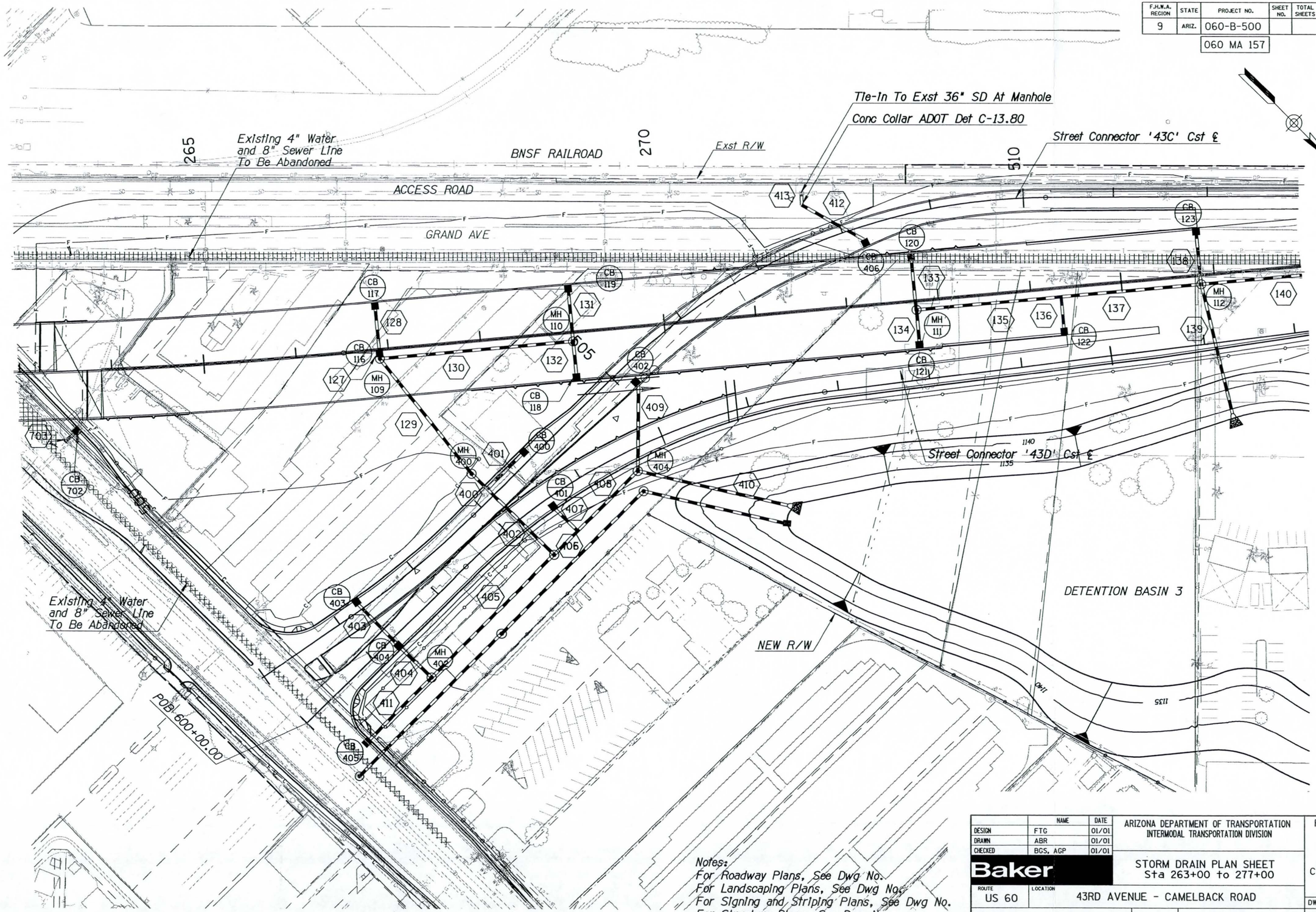
		060 MA 157			



Notes:
For Roadway Plans, See Dwg No.
For Landscaping Plans, See Dwg No.
For Signing and Striping Plans, See Dwg No.
For Structure Plans, See Dwg No.

	NAME	DATE
DESIGN	FTG	01/01
DRAWN	ABR	01/01
CHECKED	BGS, AGP	01/01

Baker

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

STORM DRAIN PLAN SHEET
Sta 263+00 to 277+00

ROUTE: US 60
LOCATION: 43RD AVENUE - CAMELBACK ROAD

TRACS NO. H 5532 01C
060-B-500

PRELIMINARY
60% Review
NOT FOR CONSTRUCTION OR RECORDING

DWG. NO. D-1.3

___ OF ___

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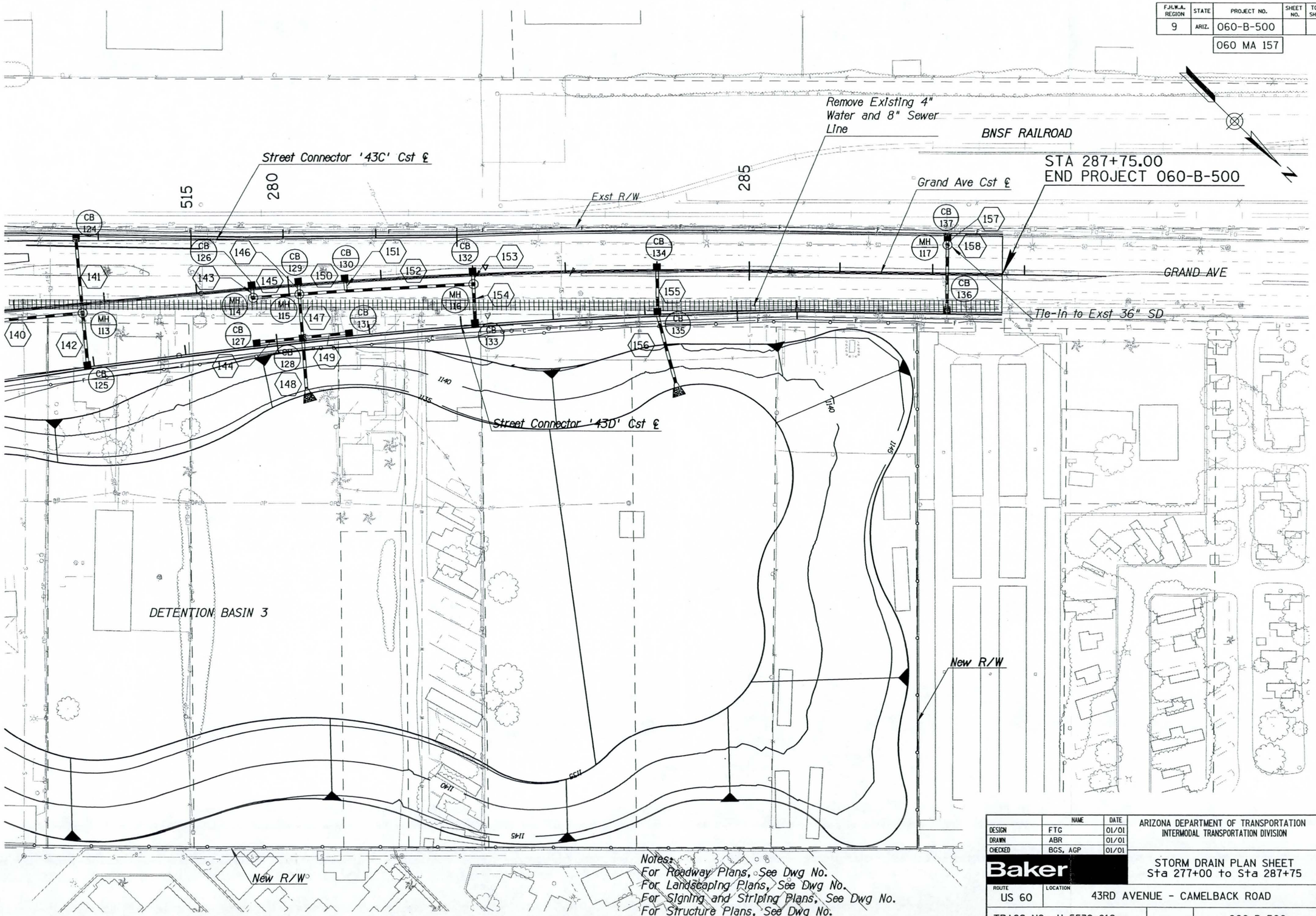
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	060-B-500			
		060 MA 157			



Notes:
For Roadway Plans, See Dwg No.
For Landscaping Plans, See Dwg No.
For Signing and Striping Plans, See Dwg No.
For Structure Plans, See Dwg No.

	NAME	DATE
DESIGN	FTG	01/01
DRAWN	ABR	01/01
CHECKED	BGS, AGP	01/01

Baker

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

STORM DRAIN PLAN SHEET
Sta 277+00 to Sta 287+75

ROUTE: US 60
LOCATION: 43RD AVENUE - CAMELBACK ROAD

TRACS NO. H 5532 01C
060-B-500

PRELIMINARY
60% Review
NOT FOR CONSTRUCTION OR RECORDING

DWG. NO. D-1.4
___ OF ___

DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.

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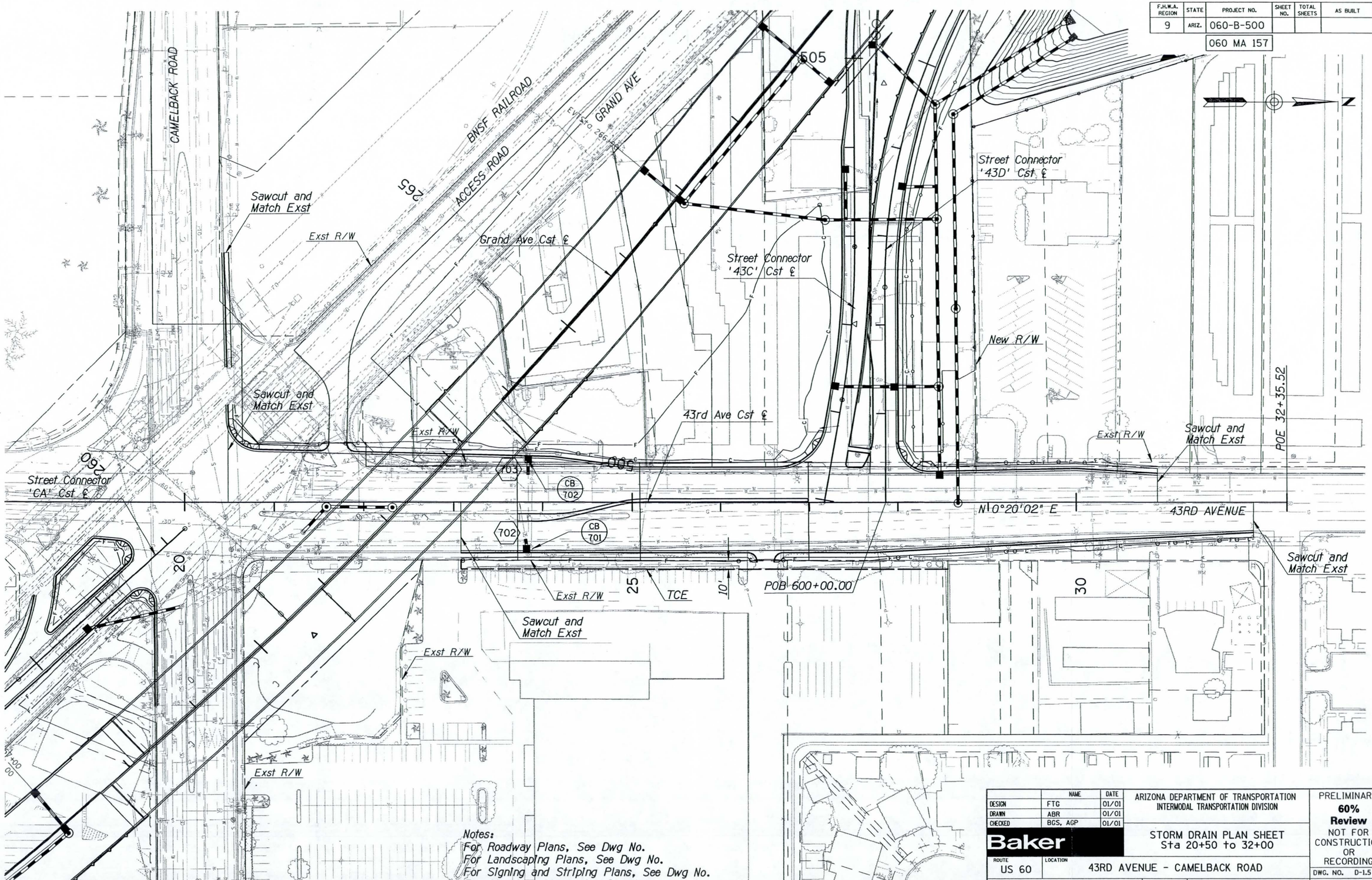
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	060-B-500			

060 MA 157



Notes:
For Roadway Plans, See Dwg No.
For Landscaping Plans, See Dwg No.
For Signing and Striping Plans, See Dwg No.
For Structure Plans, See Dwg No.

	NAME	DATE
DESIGN	FTG	01/01
DRAWN	ABR	01/01
CHECKED	BGS, AGP	01/01

Baker

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

STORM DRAIN PLAN SHEET
Sta 20+50 to 32+00

ROUTE: US 60
LOCATION: 43RD AVENUE - CAMELBACK ROAD

TRACS NO. H 5532 01C
060-B-500

PRELIMINARY
60% Review
NOT FOR CONSTRUCTION OR RECORDING

DWG. NO. D-1.5
___ OF ___

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DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.