

STORM DRAIN MASTER PLAN

City of McFarland, Kern County, California

Prepared for
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Table of Contents

Figures

Figure 1-1: Regional Location Map.....	1-2
Figure 1-2: Project Location Map.....	1-3
Figure 3-1: City of McFarland Soils Map.....	3-2
Figure 3-2: City of McFarland Land Use Map	3-3
Figure 4-1: Proposed Basin Locations	4-4
Figure 5-1: City of McFarland Existing Storm Drain Systems.....	5-5
Figure 5-2: West Watershed Pipe Deficiencies	5-6
Figure 5-3: West Watershed Proposed Storm Drain Systems (10-Year).....	5-12
Figure 5-4: West Watershed Proposed Storm Drain Systems (100-Year).....	5-15
Figure 5-5: East Watershed Pipe Deficiencies.....	5-21
Figure 5-6: East Watershed Proposed Storm Drain Systems (10-Year).....	5-25
Figure 5-7: East Watershed Proposed Storm Drain Systems (100-Year).....	5-27

Tables

Table 2-1: Hydrology Background Information	2-1
Table 2-2: Design Protection Levels for Streets	2-2
Table 5-1: West Watershed Street Deficiencies Per Max Allowable Flow (10-Year)	5-2
Table 5-2: West Watershed Street Deficiencies Exceeding Max Capacity Flow (10-Year)	5-3
Table 5-3: West Watershed Pipe Deficiencies (10-Year)	5-3
Table 5-4: West Watershed Sump Basins (10-Year)	5-4
Table 5-5: West Watershed Street Deficiencies Per Max Allowable Flow (100-Year)	5-7
Table 5-6: West Watershed Street Deficiencies Exceeding Max Capacity Flow (100-Year)	5-8
Table 5-7: West Watershed Pipe Deficiencies (100-Year)	5-9
Table 5-8: West Watershed Additional Proposed Pipes (10-Year).....	5-10
Table 5-9: West Watershed Proposed Upsizing of Existing Pipes (10-Year).....	5-11
Table 5-10: West Watershed Additional Proposed Pipes (100-Year).....	5-13
Table 5-11: West Watershed Proposed Upsizing of Existing Pipes (100-Year).....	5-14
Table 5-12: West Watershed Cost Estimate Summary (10-Year)	5-16
Table 5-13: West Watershed Cost Estimate Summary (100-Year)	5-16
Table 5-14: East Watershed Street Deficiencies Per Max Allowable Flow (10-Year).....	5-18
Table 5-15: East Watershed Pipe Deficiencies (10-Year)	5-19
Table 5-16: East Watershed Sump Basin (10-Year).....	5-20
Table 5-17: East Watershed Street Deficiencies Per Max Allowable Flow (100-Year).....	5-22
Table 5-18: East Watershed Street Deficiencies Exceeding Max Capacity Flow (100-Year).....	5-22
Table 5-19: East Watershed Pipe Deficiencies (100-Year)	5-23
Table 5-20: East Watershed Additional Proposed Pipes (10-Year).....	5-24
Table 5-21: East Watershed Proposed Upsizing of Existing Pipes (10-Year).....	5-24
Table 5-22: East Watershed Additional Proposed Pipes (100-Year).....	5-26
Table 5-23: East Watershed Proposed Upsizing of Existing Pipes (100-Year).....	5-26
Table 5-24: East Watershed Cost Estimate Summary (10-Year).....	5-28
Table 5-25: East Watershed Cost Estimate Summary (100-Year).....	5-28
Table 7-1: Prioritization of Pipes to be Improved.....	7-2

Exhibits

Exhibit 1 – City of McFarland Hydrology Map

Appendices

Appendix A – FEMA-LOMR 11-09-0622P, Existing Conditions Hydrology Calculations

Appendix B – Street Capacity and Storm Drain Pipe Hydraulic Analysis

Appendix C – Sump Basin Calculations

Appendix D – Detailed Cost Estimations

1 Introduction

1.1 Purpose

The City of McFarland Master Plan of Storm Drainage (MPD) covers the entire portion of the City of McFarland, which is located in the southern portion of the Tulare-Buena Vista Lakes Basin. See Figure 1-1 for a Regional Location Map. Storm drain facilities exist in the City, but only in the more recently developed areas, such as those west of State Route 99. There have been no previous Master Plans of Drainage for the City of McFarland. The City experiences flooding at both a regional and local level. Discussion of regional flooding in this report refers to all storm water runoff that is generated outside of the City limits. Any storm water runoff that enters the City from the mountains or nearby Poso Creek is considered to be part of the regional flooding. The purpose of the MPD is to provide comprehensive long-range planning for the implementation and development of drainage facility improvements in the area.

1.2 Background

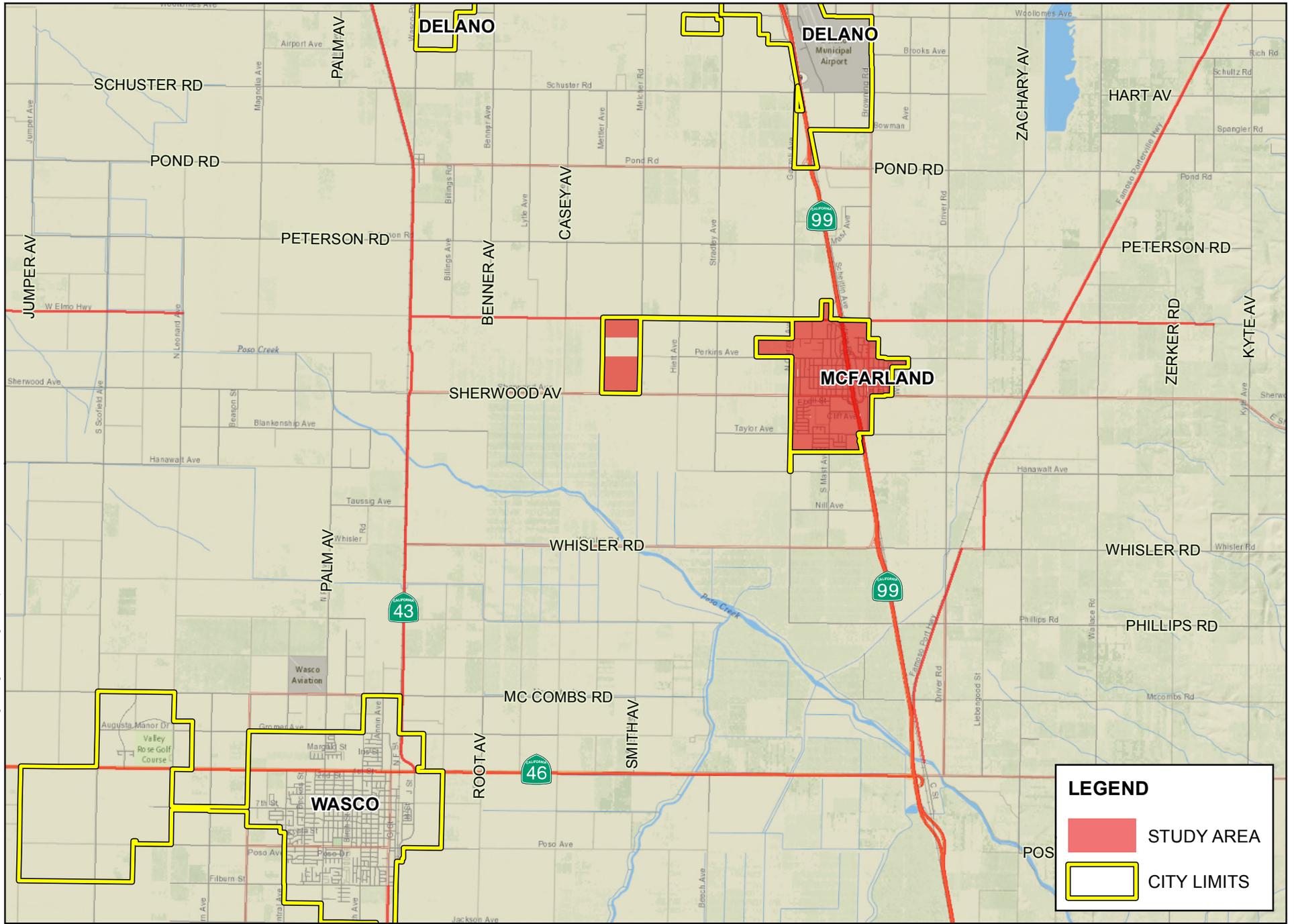
The City of McFarland lies in a very flat portion of the Tulare-Buena Vista Basin with a gradual south to north grade. The Kern County Flood Insurance Study (Effective September 26, 2008) identified two sources of regional flooding into the City. Major flood problems on the eastern side of the City result from the overflow of Poso Creek and runoff from the mountains east of McFarland. Runoff from the mountains moves along the Friant-Kern Canal south to Highway 99. The runoff then combines with overflows from Poso Creek and moves north across the canal siphon into the City. The City of McFarland is also subject to 1-percent annual chance runoff from the east resulting from flow overtopping the Friant-Kern Canal levee.

As the amount of water that floods the City of McFarland from the sources discussed above is unknown, it is not practical to size the City's storm drain infrastructure for a regional 100-year storm event, which includes the overflow from sources outside the City. However, the storm drains can be designed to capture the runoff that results within the City boundaries from a 10- and 100-year storm event. Although it would be preferable to model the runoff through the City from the local and regional areas combined, this is not possible due to the lack of data available from previous local and regional studies.

In order to better address the City's flood concerns with the data available, the regional and local sources of flooding were analyzed as two separate parts with more focus given to modeling the local flooding, which results from 10- and 100-year storm events. Although separate, solutions to minimize both regional and local flooding are discussed in Chapters 4 and 5 of this report. The local 100-year hydrology and hydraulics analysis of this report focuses on minimizing the flooding from runoff generated within the City. Sizing the City's storm drain infrastructure for a 100-year local area storm could potentially alleviate some of the flooding that occurs from the overflow of Poso Creek and the mountain runoff; however there is no guarantee that this would occur.

The location, topography, and land uses in and around the City pose unique drainage situations for the way local runoff is contained. As the City has been developed on predominantly agricultural lands, sump basins are the primary facilities used to retain the local storm water flows. There are a limited number of storm drain facilities in the City, which convey the runoff to the sump basins. In order to analyze the local hydrology and hydraulics of the area, the City has been divided into two areas of study, the West Watershed and East Watershed. The location of the areas can be seen on Figure 1-2.

2/10/2015 10:11:38 AM \\data1\38573\GIS\MXD\ZM\MPD Figures\Figure 1-1 Regional Map.mxd <NZ>

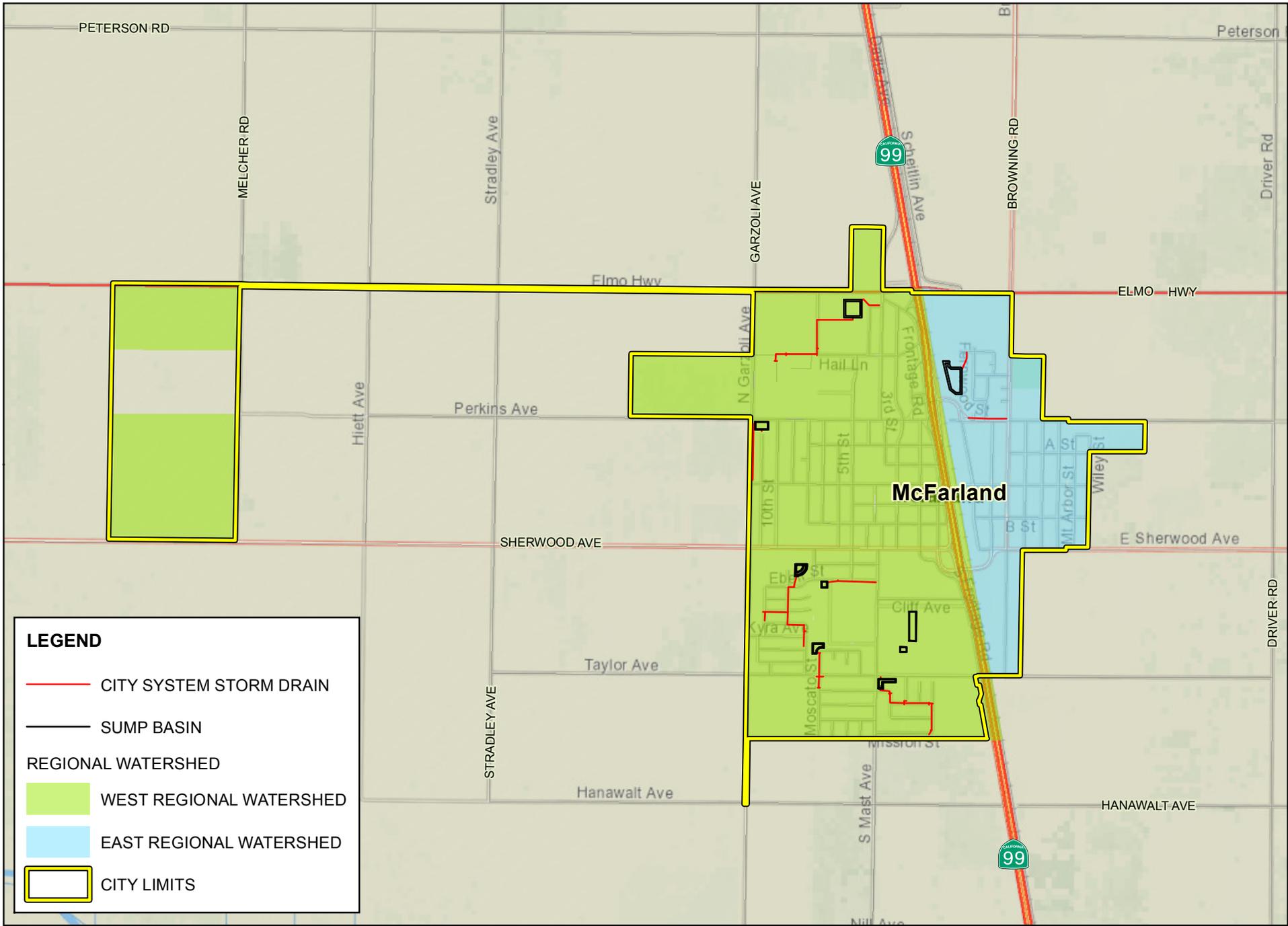


Source: ESRI base map

MCFARLAND MASTER PLAN OF DRAINAGE
REGIONAL LOCATION MAP

FIGURE 1-1

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Source: ESRI base map

FIGURE 1-2

2 Technical Criteria

2.1 Hydrology Analysis

The City is defaulting to the Kern County criteria for the analysis in this master plan. This study utilizes the Rational Method, as defined by the *Kern County Hydrology Manual* to size storm drains. The Hydrology Manual was used to properly determine times of concentration, rational method peak flow rates, unit hydrographs, and the sizing of all sump basins. This report focuses on the 10- and 100-year storm events in the area. Sizing of all storm drains and sump basins were analyzed in the 10-year and 100-year conditions. The County’s criteria and instructions for rational method hydrology calculations are contained in Section D of the *Kern County Hydrology Manual*.

The rational method hydrologic methodology was used to calculate small area peak flows for use in the hydraulics analysis of street flow conveyance and storm drain pipes. Peak flows were developed by using the AES software RATSC 2013. The hydrology parameters required for the analysis include: topography, As-Built data, hydrologic soil types, land use and aerial photography. Table 2-1 describes the parameters and their source data.

Table 2-1: Hydrology Background Information

Hydrologic Parameter	Source	Model Use
Topography	Topography provided by Kern County	Used as the basis for determining tributary areas to storm drain facilities. In areas where As-Built slopes and elevations were not available, the topography was used to determine a general slope.
As-Builts	City As-Builts for storm drains and streets	Elevations, slopes of streets and storm drain configurations shown on As-Builts were used in the process of determining tributary areas.
Hydrologic Soil Types	USDA-NRCS GIS data	Used as the basis for soil type determination in order to assign existing infiltration properties to each drainage area.
Land Use Data	General Plan maps and GIS data provided by the City	Used as the basis for land use determination. The data was then further refined with aerial photography where no land use data was provided. Land use data was missing from all streets within the City, which was ultimately assigned to be “Commercial” land use. Typical land use within the City of McFarland includes: “Low Density Residential”, “Commercial”, “Open Space”, and “School”.
Aerial Photography	Google Earth, dated 4/15/14	Used to further refine the City’s land use data where land use information was missing within the provided GIS data. Additionally, the aerial photography was also used to determine directions of flow paths at intersections (i.e. cross gutters at intersections which would influence the direction of flow).

The City of McFarland has been divided into two separate study areas. The State Route 99 corridor and Union Pacific Railroad, act as a levee between the two portions of the City. The two areas of study, or watersheds, have been labeled as the West Watershed and East Watershed (See Figure 1-2). Each watershed has been further divided into individual drainage areas which were ultimately used to compute hydrology calculations. A complete Hydrology Map for the entire City can be seen in Exhibit 1. The results are included for each drainage area (Chapter 5).

2.2 Hydraulics Analysis

The hydraulic analysis was completed by modeling conveyance of storm water via street flow and storm drain pipes. Street flow calculations and storm drain pipes were modeled within Bentley FlowMaster. Input parameters associated with this modeling process include: typical roadway sections and storm drain configurations (sizes, inverts, and lengths). Storm drain configurations were extracted from City As-Built information. The hydraulics analysis was ultimately completed for the 10- and 100-year existing condition as well as the 10- and 100-year proposed condition associated with each major watershed area.

It should be noted that in areas where no As-Built information was available, the existing storm drain systems and sump basins were assumed to have hydraulic features similar to those of the other facilities in which information was provided.

Street capacity deficiencies were determined based on the Kern County design protection levels for streets from the *Kern County: Division Four-Standards for Drainage* design manual. Refer to Table 2-2 for the design protection levels associated with the 10- and 100-year conditions. The equivalent maximum allowable flow rate was determined based on a typical street cross section and the associated maximum allowable depth.

Table 2-2: Design Protection Levels for Streets

Type of Street	Maximum Allowable Flooding	Maximum Allowable Depth (ft)	Maximum Allowable Flowrate (cfs)
10-Year			
Local/Residential	0.10' Above Top of 6" Curb	0.6	19.6
Local/Collector (86')	0.10' Above Top of 6" Curb	0.6	19.6
Arterial (100')	0.10' Above Top of 6" Curb	0.6	19.6
100-Year			
Local/Residential	At or Below ROW Line	0.7	33.2
Local/Collector (86')	One 12' Travel Lane Free of Flooding	0.6	19.6
Arterial (100')	One 12' Travel Lane Free of Flooding	0.6	19.6

All residential, collector, and arterial streets within the City of McFarland were generalized to follow the criteria of the roadway types listed in Table 2-2. Typical roadway sections were obtained from Caltrans's *Complete Street 2035 Circulation Element: City of McFarland* and the *Kern County: Division One-Standards for Streets* design manual.

In the 10-year condition, the maximum depth of flow in all streets is limited to 0.1-feet above the top of a 6-inch curb as defined in Chapter Five of the *Division Four-Standards for Drainage* design manual. Since all of the street sections modeled are geometrically similar, the maximum allowable flow rates are the same. For the 100-year condition, the depth of flow on major and secondary highways shall be maintained as to not prohibit reasonable access. Therefore, it was assumed that in the 100-year condition, the residential streets would be allowed to flood up to their right-of-way limits. For the collector and arterial street sections, depths were still limited to a maximum of 0.6-feet, so as to provide at least one 12-foot travel lane free of flooding. The maximum allowable flow rate in the residential street section is able to convey more flow than the collector and arterial roadways because of the increased maximum allowable depth. The result of the criteria mentioned is that the residential sections have a higher maximum allowable flow rate than the collector and arterial roadways.

Based on the maximum allowable depth and flow rate values specified in Table 2-2, these criteria were established as a baseline for ultimately determining which storm drain configurations would fix existing condition deficiencies.

Existing storm drain systems have been analyzed in conjunction with the street flow capacities to identify any deficiencies and their locations. Existing pipes were determined to be deficient in size if the flow conveyed in the street section above that pipe exceeded the maximum allowable flow rate. Proposed storm drain pipes have been sized in order to convey enough runoff so as to ensure that flooding in the street sections does not exceed the parameters previously discussed. This was accomplished by making improvements to existing storm drain facilities and verifying that the street flood protection levels would not be exceeded. Improvements to existing condition models include:

1. Upsizing existing storm drain facilities
2. Extending newly proposed storm drain systems upstream of existing facilities

The proposed improvements are discussed in further detail within each watershed analysis (Section 5.1.3).

2.3 Cost Estimates

Cost estimates were created for the proposed conditions within each regional watershed. Unit costs were based on previous Master Plan of Drainage estimates which RBF Consulting has completed for other Southern California jurisdictions. All costs are in 2014 dollars.

The calculated system cost estimates include costs for engineering, construction, preparation of a Storm Water Pollution Prevention Plan, surveying, construction management and contingencies. Unit costs are specified per linear foot. Included in the unit cost are costs for excavation, shoring, bedding, backfill, compaction, removal of excess material, and trench resurfacing.

Due to the fact that construction will take place over a number of years, the total cost of implementing the Master Plan of Drainage will vary from the numbers provided in this study. The funding programs shall be adjusted to the future construction cost indexes for the design and/or construction of all recommended improvements.

3 Watershed Characteristics

3.1 General Basin Characteristics

Located in the San Joaquin Valley, the City of McFarland lies in the southern portion of the Tulare-Buena Vista Lake Watershed. The basin is very flat and primary land use in the watershed is for agricultural purposes. The basin is defined to the east by the Sierra Nevada mountain range and to the west by the coastal mountain ranges. Poso Creek, which originates from the mountains to the east, is located to the south of the City and is an upper tributary drainage area to the Tulare Watershed.

3.2 Geography and Topography

The area immediately surrounding the City is flat with the surface grade sloping from the south to the north. Stream channels east of Highway 65 are well defined, but as they approach the Friant-Kern Canal, they become broad flood plains flowing through the local orchards and fields. The Friant-Kern Canal acts as a levee structure to the east of the City, providing some protection against the runoff from the mountains. The Union Pacific Railroad and portions of Highway 99 also act as small levees, separating the west and east portions of the City. The highway and railroad contain most of the regional flooding to the eastern part of the City as displayed in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (see Appendix A). Topography provided by Kern County displays 5-foot contour lines, and where As-Built slopes or elevations were not provided, the topography was used to determine a general slope.

3.3 Hydrologic Features

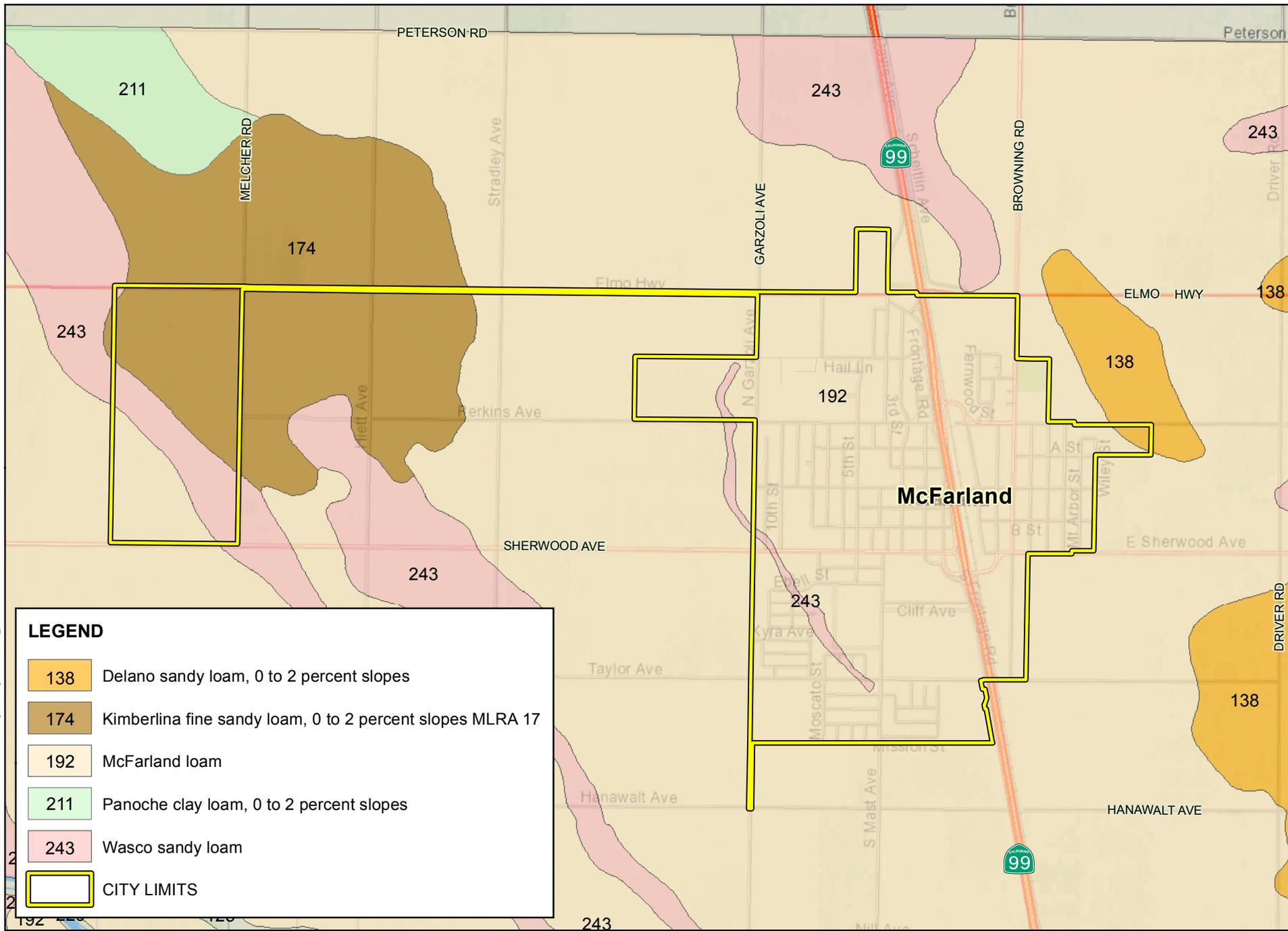
The flat terrain of the City of McFarland results in floodplains that are broad and not well defined. Currently there are no storm water basins or channels which intercept the regional overflow from Poso Creek or the mountains to the east. Local streets and storm drain facilities direct flow to nine sump basins located throughout the City. The primary purpose of these basins is to retain the local runoff that results from storm events. The West Watershed contains eight of the nine basins. The total drainage area that each of the basins accounts for is relatively small, with the exception of the two most northern sump basins west of Highway 99 (Basins “E” and “F”), and Basin “J” in the East Watershed. The inflow and storage capacities of the basins are discussed in greater detail in Chapter 5.

Soil in the McFarland drainage areas is primarily made up of McFarland loam, Kimberlina fine sandy loam, and Wasco sandy loam. All soils are well drained and have a low or very low runoff class. A map with the types of soil in the drainage areas can be seen in Figure 3-1.

3.4 Land Use

The General Plan was provided by the City of McFarland and used as the basis for land use determination. The data was compiled in GIS and then further refined with aerial photography where no land use data was provided. Land use data was missing from all streets within the City, which was ultimately assigned to be “Commercial” land use. Typical land use within the City of McFarland includes: “Low Density Residential”, “Commercial”, “Open Space”, and “School”. The Kern County Hydrology Manual and AES software classify single family residential land uses according to the number of dwelling units per acre (DU/acre). Therefore, the areas labeled as Low Density, Medium Density, and High Density Residential, in the City’s General Plan, correspond to 3-4 DU/acre, 5-7 DU/acre, and 8-10 DU/acre, respectively. The City of McFarland Land Use Map is provided as Figure 3-2.

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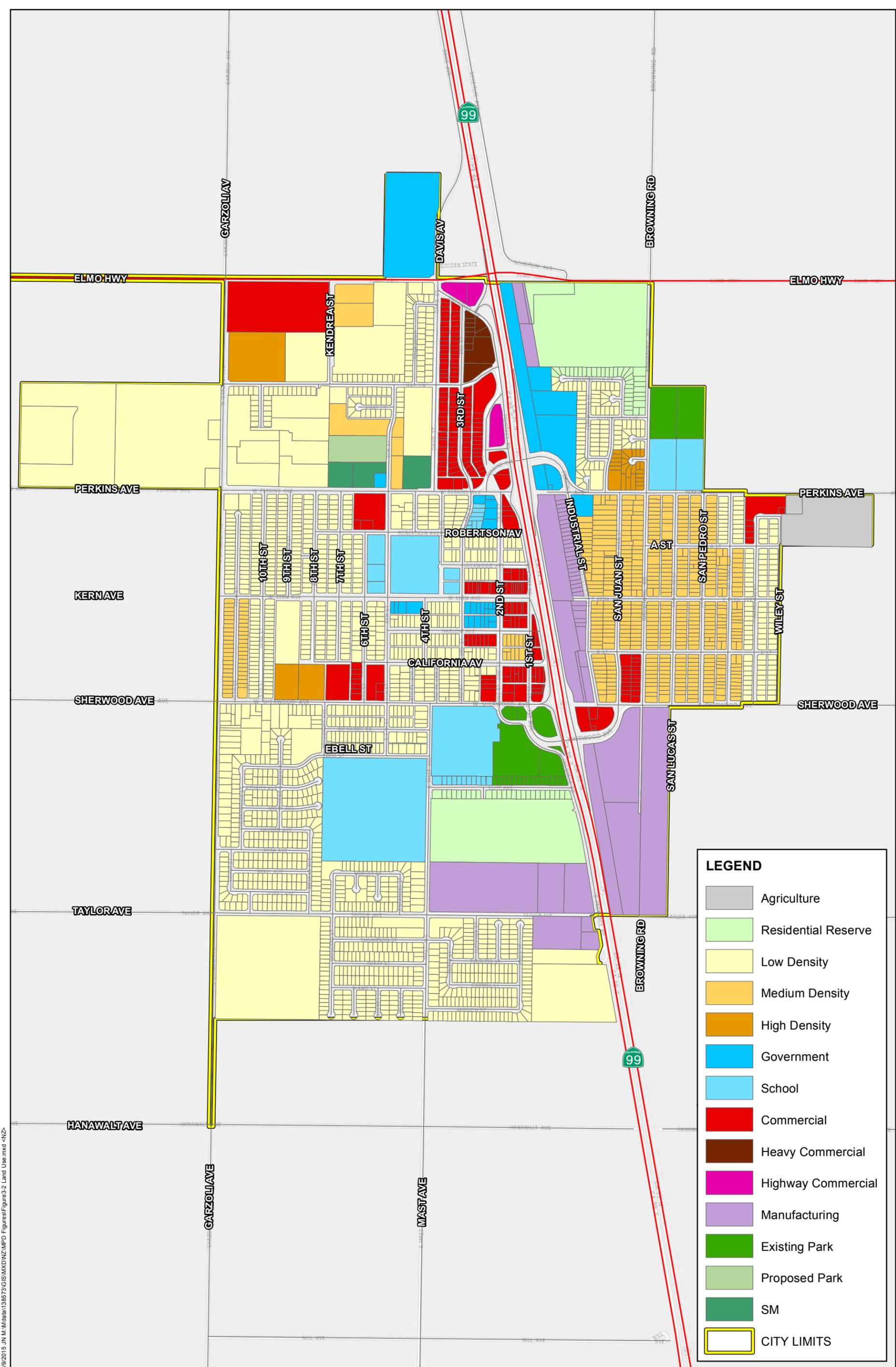


Source: ESRI base map

MCFARLAND MASTER PLAN OF DRAINAGE

SOILS MAP

FIGURE 3-1



LEGEND

- Agriculture
- Residential Reserve
- Low Density
- Medium Density
- High Density
- Government
- School
- Commercial
- Heavy Commercial
- Highway Commercial
- Manufacturing
- Existing Park
- Proposed Park
- SM
- CITY LIMITS

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MCFARLAND MASTER PLAN OF DRAINAGE
GENERAL PLAN LAND USE

FIGURE 3-2

4 Regional Hydrology

4.1 Background

Regional flooding on the eastern side of the City of McFarland is a result from the overflow of Poso Creek and runoff from the mountains east of McFarland. The runoff ponds behind the Friant-Kern Canal and then flows southerly along the east canal bank. Both the overflow from Poso Creek and runoff from the canal flow northerly toward McFarland through the canal siphon at State Highway 99. East of State Highway 99, there are overland flows with an average depth of less than 1 foot. Past flooding on the east side of the City, as recently as 1978, was caused by these two sources. Although the effective Flood Insurance Study (FIS) identifies the source of flooding stated above, there is no current overflow analysis from FEMA for how much flow is coming from Poso Creek.

The current FIS also states that in addition to the flooding from Poso Creek, at the Friant-Kern Canal and Highway 99 crossing, the City is subject to 1-percent chance annual runoff from the east resulting from flow overtopping the canal levee. The canal levee could fail if overtopped. Therefore, once the canal is breached, runoff from the east would spread out and flow into the City of McFarland. No flows have overtopped the canal levee since its opening in 1953, but water has ponded near the top of the levee.

Hydrology and hydraulic data from the past FIS and FEMA floodplain maps is extremely limited and although the sources of regional flooding through the City have been identified, it is unclear how the extents and depths of the currently mapped floodplain were determined. It is not known how much overflow from Poso Creek contributes to the flooding in the City. Likewise, runoff flowing along the Friant-Kern Canal from the mountains is unknown. Larger floodplain studies encompassing the region around the City of McFarland would be necessary to provide a clear understanding of the type of volume flowing through the City.

4.2 Previous FEMA Revisions

Past FEMA studies have continuously referenced an “Unnamed Ponding Area” along the Union Pacific Railroad and State 99 Highway. It is inferred that the overflow from Poso Creek and the runoff from the Friant-Kern Canal contributes to the cause of this unnamed ponding area, however what is unclear is the amount of flow in the area, the depth of the water, and the extents of the flooding.

A Letter of Map Revision (LOMR) for the City of McFarland and Kern County, dated December 20, 2010, changed the types of flooding zones on FIRM panels 06029C0740E and 06029C0750E. The revision changed the classification of two areas, previously labeled as Zone A, to Zone X. The possible breach of the Friant-Kern Canal was analyzed and it was demonstrated that a weir flow of 1,000 cubic feet per second (cfs) would produce a band of AE zone along the west side of the canal. A shaded Zone X would be supported west of the transition point where the depth of flooding becomes less than 1 foot.

4.3 Proposed Future Options

As stated in the FIS, at the City of McFarland, protection from major flood events less than the 1-percent annual chance event is provided by the Friant-Kern Canal and its built-up bank. Runoff from the mountains, located east of McFarland, ponds against the east bank of the canal. Flap gates allow water to enter the canal and be carried away. Under major events, the canal cannot carry away enough flow to keep the water from flowing south to the opening at State Highway 99 and north toward the City.

Based on the current FEMA floodplain maps, the agency still believes that there is a risk of overtopping of the canal levee. Improving the regional flooding issue is a large task that would require coordination from many agencies. Kern County, FEMA, the Friant Water Authority, the Department of Water Resources, the Bureau of Reclamation, Caltrans, and the Union Pacific Railroad all have vested interests

in the area. In order to improve the existing regional hydrologic conditions for the areas in and around the City of McFarland, a restudy of the existing regional hydrology and hydraulic conditions of Poso Creek and the Friant-Kern Canal are needed. These studies would be part of a more comprehensive document beyond this City of McFarland Storm Drain Master Plan.

Improvements to Poso Creek could reduce the amount of flow that could enter into the City from the south. Changes in channel hydraulics, such as widening the channel width, or increasing the heights of the top of banks could reduce the overflow. Such improvements have their own challenges as the changes would likely have to be approved by many of the agencies previously listed. Poso Creek also crosses Caltrans and Union Pacific Railroad facilities and improvements at the Poso Creek bridge crossings would be challenging. Hydraulic models of the overflow from Poso Creek would also need to be generated as it is uncertain how much flow currently deviates from the Creek and flows north along the railroad and highway.

Ring levees could possibly be a solution that would redirect runoff around the City, as well as detention basins to capture the large overflow. However, if detention basins were to be built, they would be very large in size due to the volume of runoff from Poso Creek and the runoff east of the Friant-Kern Canal. This volume is anticipated to be much larger than what a local storm drain and detention basin are designed for. Flows of such a large magnitude are usually conveyed via an open channel. This may be another solution that the City could look into further in order to solve the regional flooding problems. There are issues to building an open channel through the City, as the area is very flat and it may be difficult to achieve a slope great enough to convey a large amount of flow. Also, if a channel were to be built, it may solve the City's flooding problems, but it would inundate land at the downstream outlet of the system. Facilities such as levees, detention basins, and open channels could be effective in reducing the regional flooding; however, a cost analysis and additional studies would be required to determine the viability of such options.

As part of the Storm Drain Master Plan, the City has investigated the preliminary feasibility of siting three different sump basins within the City. Two of the sites are located east of State Highway 99 with the third located at the southwest corner of the City. The proposed locations can be seen in Figure 4-1.

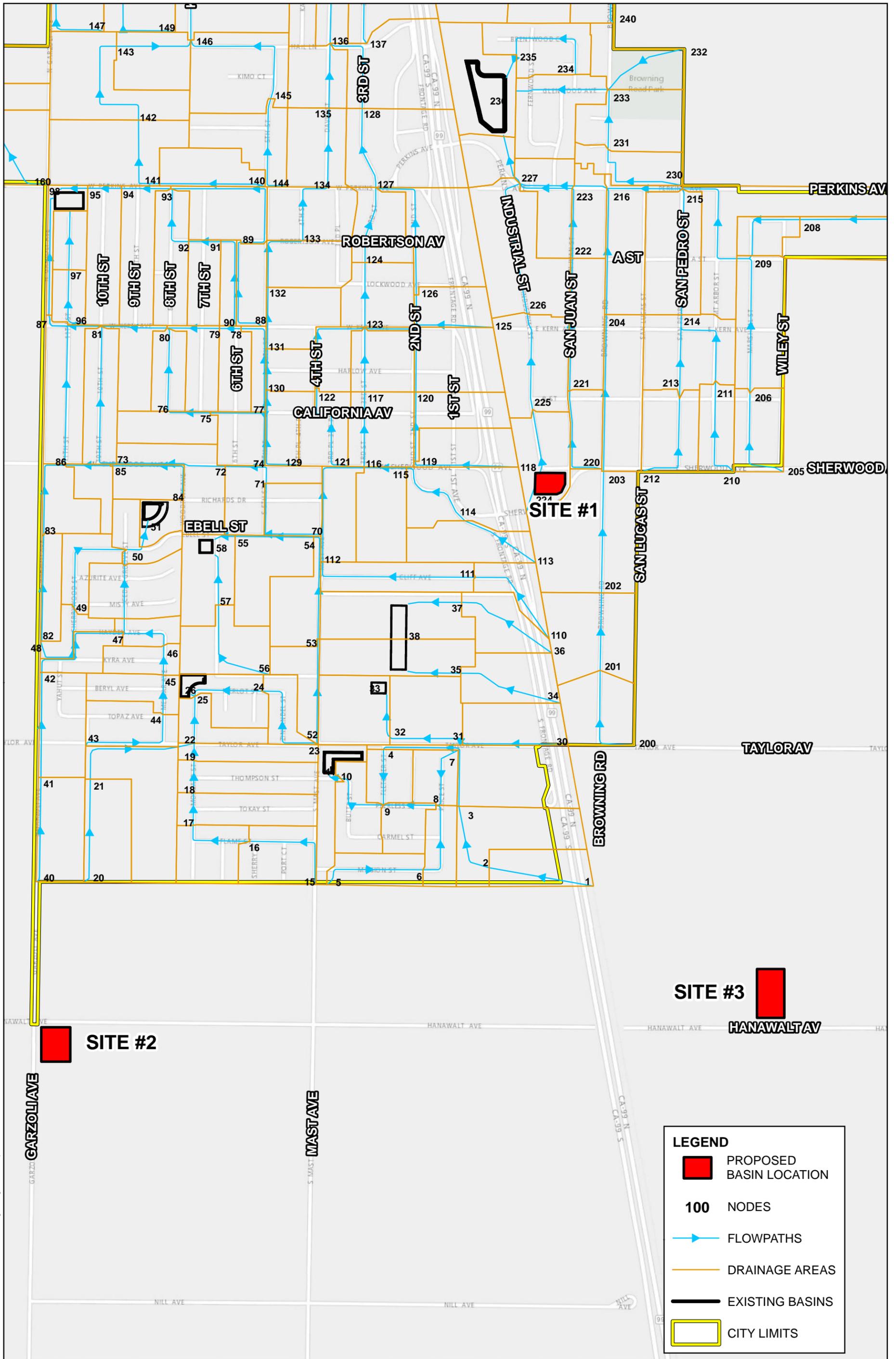
The first site (Site #1) is located north of the proposed Discovery Park and is bounded by the Union Pacific Railroad to the west, Sherwood Avenue to the North, and the Sherwood Avenue Overcrossing to the east and south. A sump basin at this location could be feasible for the mitigation of floodplain impacts. The overall location is currently within the mapped floodplain and would likely help protect a part of the east side of the City from overflows associated with Poso Creek. However, in order to intercept those regional overflows, a channel would have to be constructed along Sherwood Avenue to direct flows to the basin site. Pipes or culverts would have to be constructed underneath the Sherwood Avenue Overcrossing and Browning Road to convey flows from the channel to the basin site. While this approach will intercept some of the regional flows, it cannot capture the flow between State Highway 99 and the Union Pacific Railroad. It also does not address the possible regional flow from a canal failure.

Site #2 is located at the southeast corner of the Garzoli Avenue-Hanawalt Avenue intersection. This second location does not provide any real regional benefit to the City, as the closest mapped floodplain extents are at the corner of Garzoli Avenue and Nill Avenue. The regional flow of the mentioned floodplain is sheet flow across the fields. A sump basin at this location may be beneficial as a future basin serving adjacent developments much like the existing basin at the intersection of Garzoli Avenue and Perkins Avenue.

The third location of a possible sump basin lies just north of Hanawalt Avenue and east of the dairy farm along State Highway 99. Site #3 is located just outside of the FEMA Zone AH floodplain and would likely have an interception channel similar to Site #1. A basin in this area could be much larger in size than the basin in Site #1 and consequently would have the capacity to intercept more overflow from Poso Creek before it reached the City limits. The channel for this basin would start at the railroad and proceed

east along the north side of Hanawalt Avenue until it reached the basin. Optimal placement for the basin would be along the west side of the site adjacent to the dairy farm. Like Site #1, the location of this basin would not protect the City from a canal failure and flows between the highway and railroad would be difficult to capture.

The three proposed sites each have their own benefits that would help protect the City from flooding. For Site #1, the basin is located in the Zone AH floodplain and would likely provide some protection for the City from regional flooding. However, the level of protection desired may require a basin with a capacity much larger than the site allows due to the railroad right-of-way, surrounding streets, and transmission tower at the southwest corner of the site. The volume of flow from Poso Creek may be much larger than the site could handle. As the major regional flooding through the City occurs east of State Highway 99, Site # 2 would be better suited as a local retention basin for any future developments at the south end of the City. Conveyance of regional flows to a basin at this site may prove to be too costly. A basin at this location would be similar to the existing sump basins within the City. Overall, Site #3 is probably the best of the three locations due to its proximity to the existing regional floodplain and the possible storage capacity at the site. Site #3 offers more space for a larger basin which may be able to mitigate flows into the City by a significant amount. A more detailed study of the regional flooding in the McFarland area would need to be performed first so that an accurate floodplain extent and overflow volume of runoff breaching the Friant-Kern Canal-Union Pacific Railroad crossing can be determined.



6/26/2015, IN W:\Mdata\138573\GIS\MXD\NMPD Figures\Figure 4-1 - Proposed Basins.mxd -NZ-



0 550 1100 Feet

Source: ESRI base map

MCFARLAND MASTER PLAN OF DRAINAGE

PROPOSED BASIN LOCATIONS

FIGURE 4-1

5 Local Hydrology

5.1 West Watershed

The West Watershed system includes networks that are tributary to the eight sump basins in the area west of State Route 99. The watershed area is generally bounded by Hanawalt Avenue to the south, Garzoli Avenue to the west, Elmo Highway to the north, and Frontage Road to the east. Most of the watershed is developed with low and medium residential, commercial, school, manufacturing and civic land uses. Runoff from the watershed flows to the sump basins through street gutters and storm drains. Analysis of the entire area was divided into nine tributary areas. Each of the nine areas was labeled with a letter which corresponds to its sump basin tributary area. The sump basin tributary areas were then further divided for analysis, resulting in a total of one hundred and thirty (130) sub areas, which covers the entire West Watershed. Refer to the Exhibit 1 – City of McFarland Hydrology Map, for the locations of the West Watershed Sub-Areas.

The division of Sub Areas within this watershed allows for an easier interpretation of the locations of existing or proposed storm drain segments. Discussion in the following sections, including the hydraulic modeling approach and proposed improvements, all reference these Sub Areas. It should also be noted that the hydrology and hydraulics analysis performed for the West Watershed does not include any off site run-on storm water, that is, the calculations do not take into account any runoff that flows into the City from the surrounding areas outside of the City limits.

5.1.1 Hydrologic Analysis

The hydrology was completed with the AES software RATSC 2013 using all input parameters as previously described in Table 2-1. Hydrologic computations were utilized within the AES program to generate peak flow rates used to determine the locations of street and storm drain deficiencies. 10- and 100-year hydrology has been completed for the West Watershed. All hydrologic calculations have been included in Technical Appendix A of this report.

5.1.2 Analysis of Existing Improvements

The existing condition hydraulics was used to identify potential existing street and storm drain deficiencies. This was accomplished by modeling the existing surface and pipe flow conditions using AES, FlowMaster, and a street deficiencies spreadsheet in Microsoft Excel. The following describes the method used to analyze the existing condition hydraulics.

Street sections were modeled in FlowMaster to obtain the capacity of flow that could be conveyed by the streets in accordance with the *Kern County: Division Four-Standards for Drainage* design manual. The maximum allowable capacity of a roadway section varies depending on the calculated slope of the street from node to node. Actual capacities can be found in the McFarland Street Flow Analysis spreadsheet located in Appendix B. Refer to Table 2-2 for the design protection levels associated with the 10- and 100-year conditions.

All storm drain pipes were modeled within FlowMaster and the maximum full flow capacities of the pipes were calculated. The peak flows from AES, street flow capacities from FlowMaster, and pipe capacities were all entered into a street flow calculation spreadsheet in Microsoft Excel. The spreadsheet was organized according to sub area designations and hydrology node numbers. Street flows between each node were determined by subtracting the storm drain full flow capacity (FlowMaster) from the calculated hydrology peak flows (AES). Street capacity deficiencies were identified where the calculated street flows exceeded the maximum allowable flow rates for each section. The hydraulic full flow capacity outputs from FlowMaster can be found in Appendix B.

The naming convention for all pipes in the City are labeled in the following format: McF_45-46_EX. The first segment of the label (McF) identifies the agency responsible for the facility, in this case it is the City of McFarland; this is common to all pipes analyzed. The first number in the label (45) indicates the upstream node of the pipe. Likewise, the second number (46) indicates the downstream node. The last segment in the label (EX) identifies whether the pipe is existing (EX) or proposed (PR). Proposed pipes for the 100-year condition will have the following label format: McF_115-116_PR100, in which the 100 number at the end of the label indicates that the pipe is sized for the 100-year storm event.

Street design protection levels and flooded widths for each tributary area were looked at first. Street deficiencies were identified when the runoff flowing along the street exceeded the maximum allowable values. Once this process was completed for all street sections in the tributary areas, the existing storm drain sizes were analyzed next. This process was carried out for both the 10- and 100-year conditions.

5.1.2.1 10-Year Existing Street and Storm Drain Analysis

Based on the 10-year street deficiency criteria listed in Table 2-2, a total of 18 street sections experienced flooding above the maximum allowable capacity. Deficient street sections for the 10-year condition are listed in Table 5-1.

Table 5-1: West Watershed Street Deficiencies Per Max Allowable Flow (10-Year)

Street Deficiencies Per Max Allowable Flow (10-Year)			
Downstream Node	Sub Area	Street Type	Overflow (cfs)
Tributary Area A			
4	A3	Collector	2
Tributary Area C			
32	C2	Collector	4
Tributary Area E			
81	E11	Collector	6
87	E16	Collector	14
94	E22	Collector	2
95	E23	Collector	2
98*	E24	Collector	10, 1*
Tributary Area F			
116	F6	Collector	5
123	F11	Collector	7
124	F14	Residential	18
127	F15	Residential	20
127	F17	Collector	4
128	F18	Residential	31
136	F19	Residential	33
139	F27	Residential	36
153	F30	Residential	19
152	F41	Primary (4)	1

* Flooding occurs on Garzoli Avenue from Node 87 to 98 and Perkins Avenue from Node 95 to 98.

In addition to calculating the maximum allowable flow for each street type based on Kern County criteria, the maximum street capacity was calculated also. This assumes that the street sections are completely flooded up to the right-of-way limits. Of the 18 street sections that experienced flooding, 5 were found to have flooding that would stretch beyond the right-of-way limits of the street. The amount of flow conveyed over the right-of-way limit can be seen in Table 5-2.

Table 5-2: West Watershed Street Deficiencies Exceeding Max Capacity Flow (10-Year)

Street Deficiencies Exceeding Max Capacity Flow (10-Year)			
Downstream Node	Sub Area	Street Type	Max Capacity Overflow (cfs)
Tributary Area F			
124	F14	Residential	3
127	F15	Residential	6
128	F18	Residential	18
136	F19	Residential	20
139	F27	Residential	15

The storm drain pipe systems have been analyzed in conjunction with the street flow analysis to identify areas in which the existing pipes are undersized and do not convey enough flow to alleviate the street flooding. Pipe capacities were determined by using the Bentley FlowMaster program to determine the full flow capacity of each section of pipe. Existing pipes were determined to be deficient in size if the street flow above that pipe was also deemed to be deficient. A summary of the existing pipe deficiencies is listed in Table 5-3. Existing storm drain systems in the West Watershed can be seen in Figure 5-1. Existing storm drain pipe deficiencies in the West Watershed for the 10-year condition can be seen in Figure 5-2.

Table 5-3: West Watershed Pipe Deficiencies (10-Year)

Existing Pipe Deficiencies (10-Year)			
Existing Pipe Label	Existing Size	Full Flow Capacity (cfs)	Overflow (cfs)
Tributary Area E			
McF_87-98_EX	24"	10.1	10
Tributary Area F			
McF_139-153_EX	24"	18.7	19

The ultimate goal in improving the existing condition is to attempt to eliminate all locations which experience flooding in addition to meeting street deficiency criteria. In an effort to improve the existing condition, pipes have been upsized and systems have been extended upstream at various locations. Proposed improvements for the 10-year hydrologic condition can be found in Section 5.1.3.1.

5.1.2.2 10-Year Existing Sump Basin Analysis

Analysis of the existing sump basins within the West Watershed was completed according to the methodology outlined in Section E of the Kern County Hydrology Manual. Runoff hydrographs were generated for each basin, which represent the amount of flow entering the basin over a period of time. Information used in the hydrographs was taken from the AES RATSC 2013 results of the eight tributary areas. This includes: (i) the Area-Averaged Maximum Loss Rate (F_m), (ii) the total area, in acres, of the

tributary area, and (iii) the time of concentration (T_c) of the peak flow rate to reach the end of the system. In addition to the parameters just listed, the Area-Averaged Low Loss Fraction (\bar{Y} or Y bar) was needed for the runoff hydrographs. The Y bar values were computed using the equations listed in Section C.7.1 and C.7.2 of the Kern County Hydrology Manual. A spreadsheet containing the values for each tributary area can be found in Appendix C.

Stage storage curves were developed for each basin by relating the depth of water in the basin with the capacity volume. As there was very little information about the design capacities of the sump basins, many of the capacities were assumed.

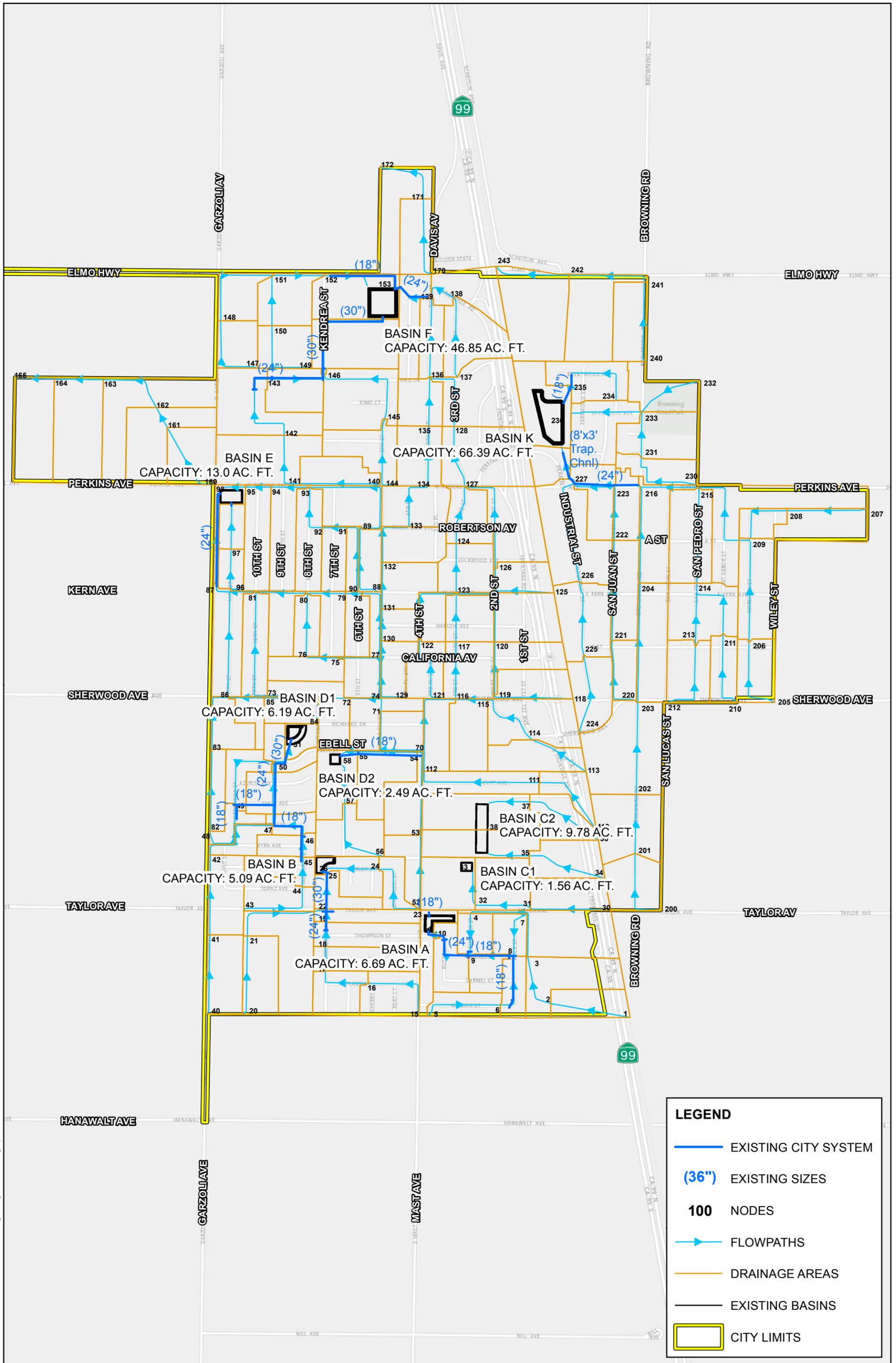
The AES FloodSCx 2013 Routing Program was used to generate results for the eight sump basins. This program generates the runoff hydrographs for each basin as well as the storage volume as a function of time. The complete AES Flood Routing outputs for each basin can be found in Appendix C.

In the West Watershed, four of the eight sump basins were found to be deficient in size. Sump Basins B, C1, D2, and E all had inflow volumes that exceeded the maximum allowable capacities. As for the rest of the basins in the West Watershed (Basins A, C2, D1, and F), it was determined that they were able to contain the entire runoff volume from the delineated tributary areas. The basin capacity, inflow volume, and overflow volume are listed in Table 5-4.

Table 5-4: West Watershed Sump Basins (10-Year)

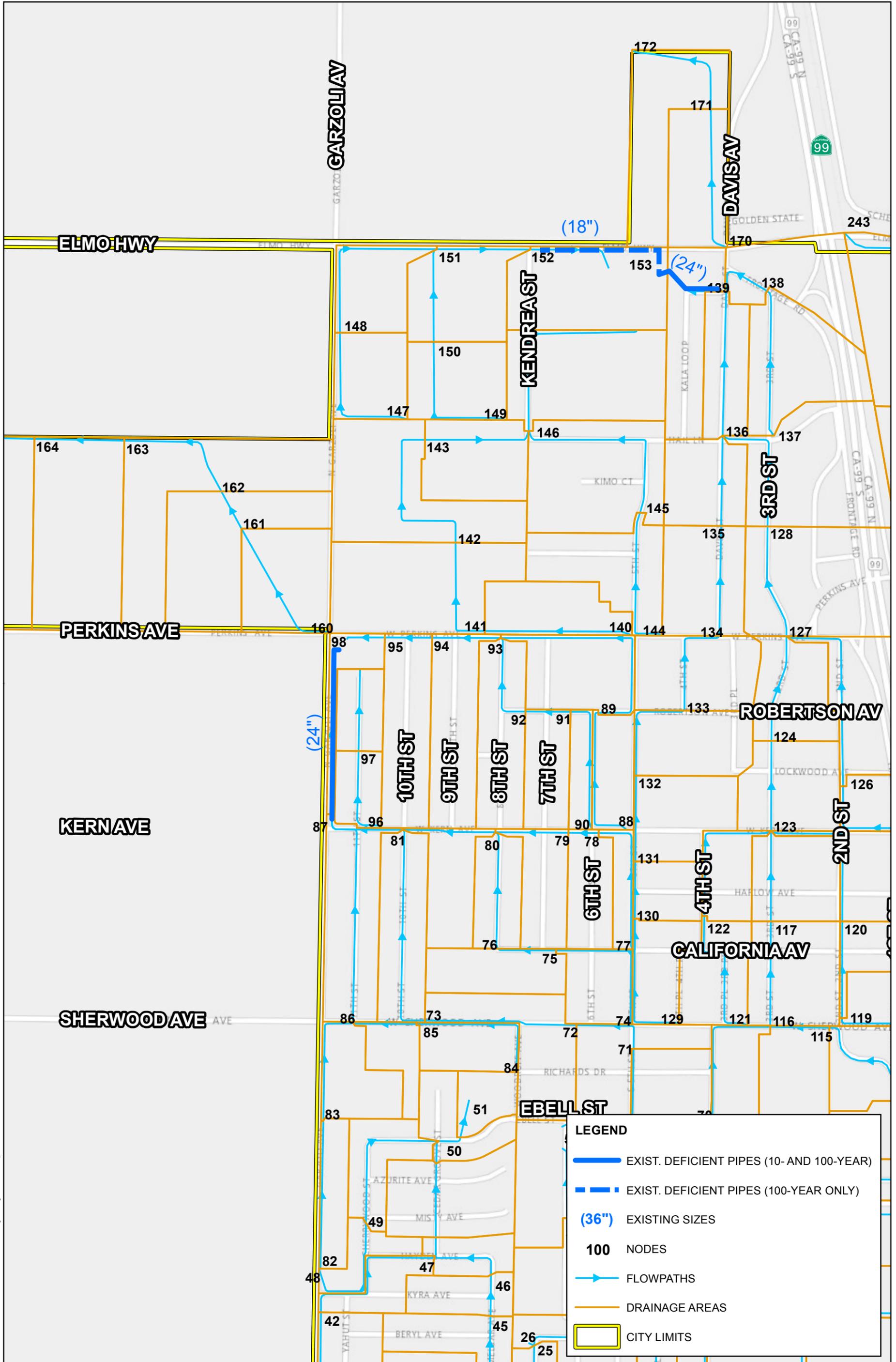
West Watershed Existing Sump Basins (10-Year)			
Basin Label	Basin Capacity (acre-ft)	Inflow Volume (acre-ft)	Overflow (acre-ft)
Basin A	6.69	6.18	-
Basin B	5.09	5.92	0.83
Basin C1	1.56	3.45	1.89
Basin C2	9.78	3.15	-
Basin D1	6.05	5.43	-
Basin D2	2.49	2.73	0.24
Basin E	13.0	13.49	0.49
Basin F	46.85	37.03	-

Proposed improvements to each of the four undersized basins include increasing the basin capacities to meet the inflow volumes from the tributary areas. Basins B and D2 are close to containing the total inflow amounts and the actual capacity of Basin D2 is uncertain as there was no As-Built information available for that basin. In order to improve the condition of Basin C1, flow could possibly be redirected to Basin C2, as that basin is much larger and has enough capacity to handle the overflow volume of Basin C1. Basin E is slightly deficient in size and requires either an increase in size or an increase in depth. Again, it should be noted that no As-Built information was available for this basin and field verification of the actual basin capacity is necessary.



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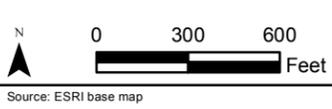




LEGEND

- EXIST. DEFICIENT PIPES (10- AND 100-YEAR)
- - - EXIST. DEFICIENT PIPES (100-YEAR ONLY)
- (36") EXISTING SIZES
- 100** NODES
- FLOWPATHS
- DRAINAGE AREAS
- CITY LIMITS

2/9/2015 11:41:13 AM \\data1\38573\GIS\MXD\MPD Figures\Figure 5-2 WW Pipe Deficiencies.mxd -4N2-



WEST WATERSHED EXISTING PIPE DEFICIENCIES

MCFARLAND MASTER PLAN OF DRAINAGE

FIGURE 5-2

5.1.2.3 100-Year Existing Street and Storm Drain Analysis

In the 100-year condition, 13 additional street sections are flooded as compared to the 10-year condition. All 31 street sections identified as being deficient in the 100-year are shown Table 5-5.

Table 5-5: West Watershed Street Deficiencies Per Max Allowable Flow (100-Year)

Street Deficiencies Per Max Allowable Flow (100-Year)			
Downstream Node	Sub Area	Street Type	Overflow (cfs)
Tributary Area A			
3	A2	Collector	7
4	A3	Collector	11
Tributary Area C			
31	C1	Collector	0.3
32	C2	Collector	12
Tributary Area D			
41	D1	Collector	2
42	D2	Collector	4
Tributary Area E			
72	E2	Collector	1
73	E3	Collector	6
80	E10	Collector	3
81	E11	Collector	18
87	E16	Collector	32
94	E22	Collector	12
95	E23	Collector	14
98*	E24	Collector	35, 14*
Tributary Area F			
116	F3	Collector	1
116	F6	Collector	18
120	F10	Collector	6
123	F11	Collector	17
123	F13	Collector	0.1
124	F14	Residential	38
127	F15	Residential	42
127	F17	Collector	12
128	F18	Residential	57
136	F19	Residential	57
132	F22	Collector	6

Street Deficiencies Per Max Allowable Flow (100-Year)			
Downstream Node	Sub Area	Street Type	Overflow (cfs)
133	F23	Residential	1
139	F27	Residential	61
153	F30	Residential	48
152	F41	Primary (4)	9
153	F42	Primary (4)	5

* Flooding occurs on Garzoli Avenue from Node 87 to 98 and Perkins Avenue from Node 95 to 98.

Similar to the 10-year existing condition hydraulics calculations, street sections with flows exceeding the maximum capacity were also identified for the 100-year existing condition. Of the 31 street sections that experienced flooding, 8 were found to have flooding that would stretch beyond the right-of-way limits of the street. The amount of flow conveyed over the right-of-way limit can be seen in Table 5-6.

Table 5-6: West Watershed Street Deficiencies Exceeding Max Capacity Flow (100-Year)

Street Deficiencies Exceeding Max Capacity Flow (100-Year)			
Downstream Node	Sub Area	Street Type	Max Capacity Overflow (cfs)
Tributary Area E			
98	E24	Collector	1
Tributary Area F			
124	F14	Residential	38
127	F15	Residential	42
128	F18	Residential	57
136	F19	Residential	57
133	F23	Residential	1
139	F27	Residential	61
153	F30	Residential	48

The eight street deficiencies in Table 5-6 have the same overflow values as those listed in Table 5-5. This is due to the fact that the maximum allowable flow rate is equal to the maximum full flow capacity that the residential roadway section can convey.

The two pipes undersized in the 10-year existing condition were also deficient in the 100-year existing condition. In addition, pipe McF_152-153_EX, along Elmo Highway, which was not deficient in the 10-year condition, was found to be undersized for the 100-year condition. A summary of the existing pipe deficiencies for the 100-year condition is listed in Table 5-7. Existing storm drain systems in the West Watershed can be seen in Figure 5-1. Existing storm drain pipe deficiencies in the West Watershed for the 100-year condition can be seen in Figure 5-2.

Table 5-7: West Watershed Pipe Deficiencies (100-Year)

Existing Pipe Deficiencies (100-Year)			
Existing Pipe Label	Existing Size	Full Flow Capacity (cfs)	Overflow (cfs)
Tributary Area E			
McF_87-98_EX	24"	10.1	35
Tributary Area F			
McF_139-153_EX	24"	18.7	48
McF_152-153_EX	18"	7.35	5

Upgrading the existing systems to meet 100-year flows requires many of the same improvements required in the 10-year condition. This includes increasing pipe sizes to convey more flow to the sump basins and extending storm drain lines farther upstream to reduce flooding. Proposed improvements for the 100-year hydrologic condition can be found in Section 5.1.3.2.

5.1.3 Proposed Improvements

Improvements to the existing drainage systems consisted primarily of upsizing existing storm drain facilities and extending existing storm drain systems farther upstream to the areas of flooding. All proposed improvements have been designed with the goal of reducing the amount of flow the street roadways convey. By capturing the surface flow on the streets via catch basins, and conveying it as pipe flow, the deficient areas identified in Section 5.1.2, will meet Kern County Flood Protection criteria.

The proposed improvements in the following sub-sections assume that the roadway sections within the City will remain as they are. Improvements to street geometries or increases in street grades will allow the street sections to convey more flow without being labeled as deficient. However, these methods were not considered in this report. More detailed design analysis of existing and proposed storm drain systems should always be completed in order to verify that correct storm drain pipe sizes are installed.

Areas in which there are no As-Built plans available, the pipes are assumed to have a slope parallel to that of the road surface. Road surface slopes have been extracted from As-Built plans or assumed from Kern County topography.

The storm drain pipe improvements proposed in the following sections are assumed to be flowing at full capacity. Analysis of existing and proposed catch basins has not been included in this report. It has been assumed that the City will install the correct configuration of catch basins in order to fill the pipes to their full flow design capacities.

5.1.3.1 10-Year Proposed Hydraulic Analysis

The southern portion of the West Watershed, which includes Tributary Areas A, B, C, and D, did not have many street sections that were deemed deficient in the 10-year condition. This portion of the City has been more recently developed in comparison with other areas of the City, and storm drain systems are present throughout. Proposed storm drain improvements include the installation of an 18" line from the existing catch basin on Taylor Avenue to the southeast corner of the Taylor Avenue-Fletcher Street intersection (Node 4). A catch basin and 18" pipe are also proposed along the north side of Taylor Road by the Taylor-Fletcher intersection. This extension will tie into the existing drainage ditch north of Taylor Avenue. Table 5-8 summarizes the locations and sizes of newly proposed pipes that extend upstream of existing systems. The proposed improvements for the 10-year condition can be seen in Figure 5-3.

Flooding in Tributary Area E occurs on Kern Avenue, Garzoli Avenue, and Perkins Avenue. By extending the storm drain line on Garzoli Avenue, from the existing catch basin at Node 87, to node 80,

Kern Avenue will not flood in the 10-year condition. To improve the condition on Garzoli Avenue between Kern Avenue and Perkins Avenue, the storm drain line should be increased to a 36” pipe. Refer to Table 5-9 for the upsizing of existing pipes. From the Perkins Avenue sump basin to 8th Street, a new storm drain line is proposed which will tie in with the existing catch basin located on Perkins Avenue.

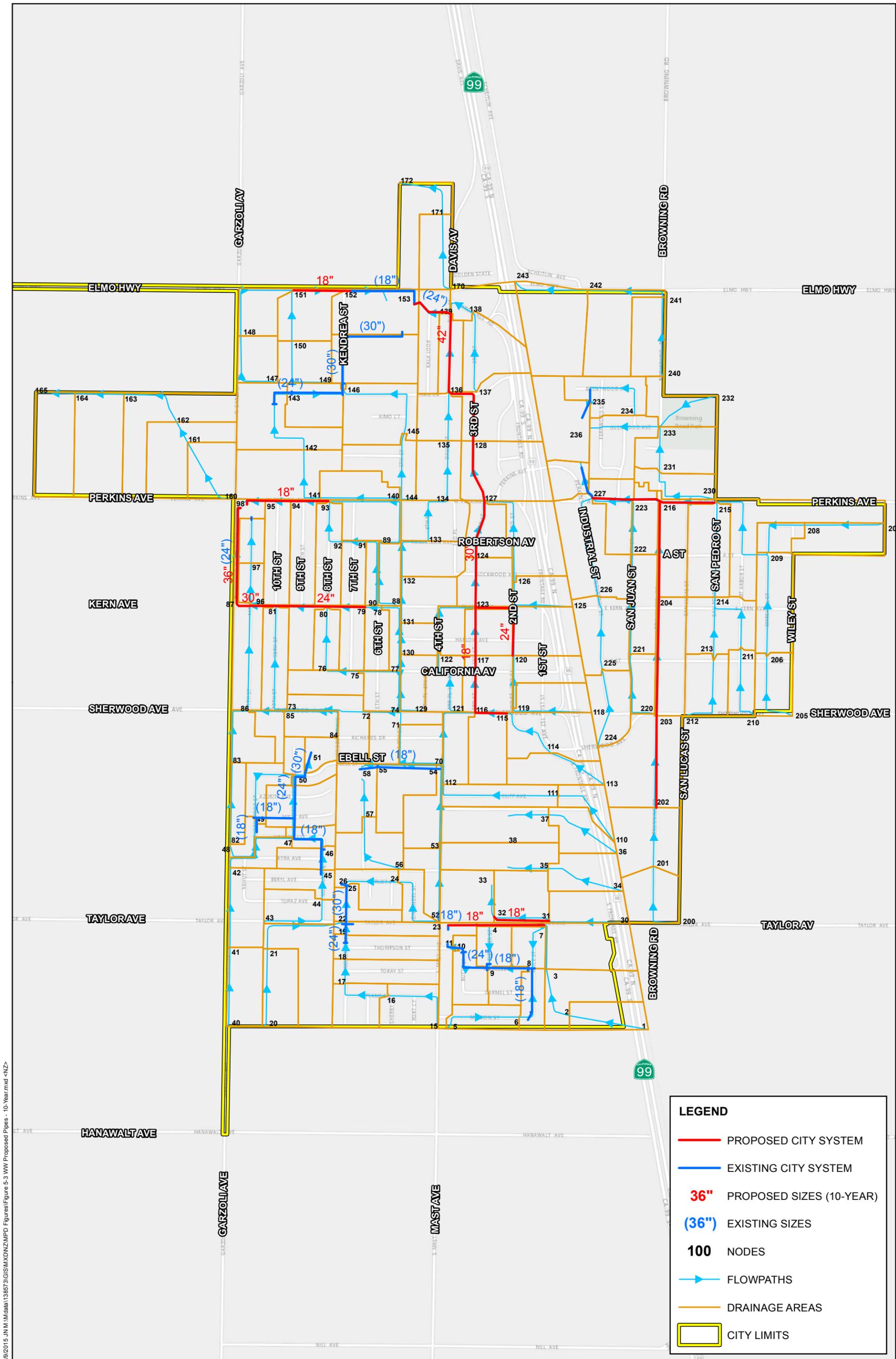
Tributary Area F has the most deficient street sections in the West Watershed. Most of the flooding occurs on 3rd Street and Davis Street beginning at Nodes 123 and 136 respectively. Extending the existing storm drain line, on Kala Loop, upstream is necessary to capture all of the overflow runoff that currently makes its way to the Elmo Highway basin as surface flow. Consequently, the pipe on Kala Loop will be upsized as more flow will be captured by the system. Proposed storm drain systems in the West Watershed for the 10-year condition can be seen in Figure 5-3.

Table 5-8: West Watershed Additional Proposed Pipes (10-Year)

Proposed Pipes to Tie-In To Existing Systems (10-Year)			
Proposed Pipe Label	Size	Full Flow Capacity (cfs)	Location
Tributary Area A			
McF_3-4_PR	18”	4.7	Taylor Avenue
McF_4-11_PR	18”	4.7	Taylor Avenue
Tributary Area C			
McF_31-32_PR	18”	4.7	Taylor Avenue
Tributary Area E			
McF_80-81_PR	24”	10.12	Kern Avenue
McF_81-87_PR	30”	18.34	Kern Avenue
McF_93-94_PR	18”	4.7	Perkins Avenue
McF_94-95_PR	18”	4.7	Perkins Avenue
McF_95-98_PR	18”	4.7	Perkins Avenue
Tributary Area F			
McF_115-116_PR	18”	4.7	Sherwood Avenue
McF_116-117_PR	18”	4.7	Sherwood Avenue
McF_117-123_PR	18”	4.7	Sherwood Avenue
McF_120-123_PR	24”	10.12	2 nd Street
McF_123-124_PR	30”	18.34	3 rd Street
McF_124-127_PR	36”	29.83	3 rd Street
McF_126-127_PR	18”	4.7	2 nd Street
McF_127-128_PR	42”	44.99	3 rd Street
McF_128-136_PR	42”	44.99	3 rd Street
McF_136-139_PR	42”	44.99	Davis Road
McF_151-152_PR	18”	4.7	Elmo Highway

Table 5-9: West Watershed Proposed Upsizing of Existing Pipes (10-Year)

Proposed Upsizing of Existing Pipes (10-Year)				
Existing Pipe Label	Existing Size	Proposed Pipe Label	Proposed Size	Max Proposed Flowrate (cfs)
Tributary Area E				
McF_87-98_EX	24"	McF_87-98_PR	36"	29.83
Tributary Area F				
McF_139-153_EX	24"	McF_139-153_PR	42"	82.96



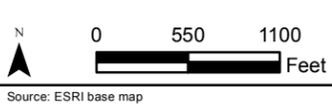
LEGEND

- PROPOSED CITY SYSTEM
- EXISTING CITY SYSTEM
- 36" PROPOSED SIZES (10-YEAR)
- (36") EXISTING SIZES
- 100** NODES
- ➔ FLOWPATHS
- DRAINAGE AREAS
- CITY LIMITS

2/9/2015 11:01:13 AM \\data1\38573\GIS\MXD\ZMPD\Figures\Figure 5-3 WW Proposed Pipes - 10-Year.mxd <N>

WEST WATERSHED PROPOSED PIPES (10-YEAR)

FIGURE 5-3



5.1.3.2 100-Year Proposed Hydraulic Analysis

As previously mentioned in Section 5.1.2.3, there were 31 streets that were flooded in the 100-year condition. There is a significant increase in runoff in the 100-year condition which requires many systems to extend farther upstream than the proposed 10-year condition. A total of 32 pipes are proposed and are listed in Table 5-10. Proposed storm drain systems in the West Watershed for the 100-year condition can be seen in Figure 5-4.

Table 5-10: West Watershed Additional Proposed Pipes (100-Year)

Proposed Pipes to Tie-In To Existing Systems (100-Year)			
Proposed Pipe Label	Size	Full Flow Capacity (cfs)	Location
Tributary Area A			
McF_2-3_PR100	24"	10.12	Frontage Road
McF_3-4_PR100	30"	18.34	Taylor Avenue
Tributary Area C			
McF_30-31_PR100	18"	4.7	Taylor Avenue
McF_31-32_PR100	30"	18.34	Taylor Avenue
Tributary Area D			
McF_40-41_PR100	18"	4.70	Garzoli Avenue
McF_41-42_PR100	24"	10.12	Garzoli Avenue
McF_42-47_PR100	24"	10.12	Garzoli Ave/Kyra Ave
Tributary Area E			
McF_79-80_PR100	18"	4.70	Kern Avenue
McF_80-81_PR100	30"	18.34	Kern Avenue
McF_81-87_PR100	42"	44.99	Kern Avenue
McF_93-94_PR100	30"	18.34	Perkins Avenue
McF_94-95_PR100	30"	18.34	Perkins Avenue
McF_95-98_PR100	30"	18.34	Perkins Avenue
Tributary Area F			
McF_112-116_PR100	18"	4.7	Mast Avenue
McF_115-116_PR100	30"	18.34	Sherwood Avenue
McF_119-120_PR100	24"	10.12	2 nd Street
McF_120-123_PR100	30"	18.34	2 nd Street
McF_122-123_PR100	18"	4.70	Kern Avenue
McF_123-124_PR100	42"	44.99	3 rd Street
McF_124-127_PR100	42"	44.99	3 rd Street
McF_126-127_PR100	30"	18.34	2 nd Street
McF_127-128_PR100	48"	64.24	3 rd Street
McF_128-136_PR100	48"	64.24	3 rd Street

Proposed Pipes to Tie-In To Existing Systems (100-Year)			
Proposed Pipe Label	Size	Full Flow Capacity (cfs)	Location
McF_131-132_PR100	24"	10.12	5 th Street
McF_132-133_PR100	24"	10.12	5 th Street
McF_133-134_PR100	24"	10.12	5 th Street
McF_134-135_PR100	24"	10.12	Davis Road
McF_135-136_PR100	24"	10.12	Davis Road
McF_136-139_PR100	48"	64.24	Davis Road
McF_151-152_PR100	24"	10.12	Elmo Highway

The proposed upsizing of the two pipes in the 10-year condition would also be too small to convey the necessary amount of flow in the 100-year condition. Each of the pipes has been increased to 48-inches. One additional pipe, McF_152-153_EX, along Elmo Highway, would be increased from the existing 18-inch size to 24-inches. The existing pipes to be upsized in the 100-year condition are listed in Table 5-11.

Table 5-11: West Watershed Proposed Upsizing of Existing Pipes (100-Year)

Proposed Upsizing of Existing Pipes (100-Year)				
Existing Pipe Label	Existing Size	Proposed Pipe Label	Proposed Size	Max Proposed Flowrate (cfs)
Tributary Area E				
McF_87-98_EX	24"	McF_87-98_PR100	48"	64.24
Tributary Area F				
McF_139-153_EX	24"	McF_139-153_PR100	48"	118.44
McF_152-153_EX	18"	McF_152-153_PR100	24"	15.83

5.1.4 Cost Estimates

Cost estimates for the West Watershed have been completed for all proposed improvements in the 10- and 100-year conditions. The grouping of all Sub Areas remains consistent with the grouping within the Proposed Facilities exhibits. Table 5-12 gives a summary of the construction cost estimates for the 10-year condition and Table 5-13 for the 100-year condition. See Appendix D for detailed cost estimates.

Table 5-12: West Watershed Cost Estimate Summary (10-Year)

Sub Area	Existing Size	Proposed Size	Total Project Cost (2014 \$)	Notes
West Watershed-Sub Areas A-F				
A	18"-24"	18"	\$410,000	New storm drain
B	24"-30"	-	-	No proposed systems
C	-	18"	\$245,000	New storm drain
D	18"-30"	-	-	No proposed systems
E	24"	18"-36"	\$1,775,000	New storm drain
F	18"-30"	18"-42"	\$6,232,000	New storm drain
Total			\$8,662,000	-
West and East Watershed: 10-Year Storm Event (Refer to Table 5-24 for East Watershed Cost Estimate)				
Grand Total			\$12,150,000	-

Table 5-13: West Watershed Cost Estimate Summary (100-Year)

Sub Area	Existing Size	Proposed Size	Total Project Cost (2014 \$)	Notes
West Watershed-Sub Areas A-F				
A	18"-24"	24"-30"	\$901,000	New storm drain
B	24"-30"	-	-	No proposed systems
C	-	18"-30"	\$669,000	New storm drain
D	18"-30"	18"-24"	\$1,028,000	New storm drain
E	24"	18"-48"	\$2,058,000	New storm drain
F	18"-30"	18"-48"	\$7,151,000	New storm drain
Total			\$11,807,000	-
West and East Watershed: 100-Year Storm Event (Refer to Table 5-25 for East Watershed Cost Estimate)				
Grand Total			\$15,780,000	-

5.2 East Watershed

The East Drainage Area encompasses the entire portion of the City of McFarland east of the Union Pacific Railroad. The watershed is generally bounded by Taylor Avenue to the south, the Union Pacific to the west, Elmo Highway to the north, and Wiley Street to the east. This system varies from the West Watershed, in that there is only one large sump basin serving the entire area. This basin receives flow from three main points: a pipe to the north, a concrete gutter to the west, and a concrete trapezoidal channel from the south. Like the West Area, most of the watershed is developed with low and medium residential, park, and school land uses. Analysis of the entire area was divided into two tributary areas. The area contributing runoff to the Fernwood sump basin was designated as Tributary Area J. The land located north of Brentwood Court has been labeled as Tributary Area K, and it is assumed that runoff in this location moves as sheet flow north along the Union Pacific Railroad. The sump basin tributary areas were further divided for analysis, resulting in a total of thirty one (31) sub areas, which covers the entire East Drainage Area. Refer to Exhibit 1 – City of McFarland Hydrology Map for the locations of the tributary areas.

The division of Sub Areas within this watershed allows for an easier interpretation of the locations of existing or proposed storm drain segments. Discussion of the following sections including the hydraulic modeling approach and proposed improvements all reference these Sub Areas. It should also be noted that the hydrology and hydraulics analysis performed for the West Watershed does not include any off site run-on storm water, that is, the calculations do not take into account any runoff that flows into the City from the surrounding areas outside of the City limits.

Analysis of the storm drain systems in the East Watershed only considers the local runoff that is produced from the 10- and 100-year storms. While it has been identified that regional flooding is an issue in the East Watershed, none of the runoff from the overflow of Poso Creek and levee was considered when sizing the proposed systems. In order to analyze a scenario in which City storm drain systems could convey both local and regional runoff, a more comprehensive study should be conducted. The addition of regional flow into the existing and proposed systems discussed in the following sections could result in larger basin and pipe sizes than recommended in this study.

5.2.1 Hydrologic Analysis

The hydrology was completed with the AES software RATSC 2013 using all input parameters as previously described in Table 2-1. Hydrologic computations were utilized within the AES program to generate peak flow values used to determine the locations of street and storm drain deficiencies. 10- and 100-year hydrology has been completed for the East Drainage Area. All hydrologic backup calculations have been included in Technical Appendix A of this report.

5.2.2 Analysis of Existing Improvements

The existing condition hydraulics was used to identify potential existing street and storm drain deficiencies. This was accomplished by modeling the existing surface and pipe flow conditions using AES, FlowMaster, and Microsoft Excel. The following describes the method used to analyze the existing condition hydraulics.

Street sections were modeled in FlowMaster to obtain the capacity of flow that could be conveyed by the streets in accordance with the *Kern County: Division Four-Standards for Drainage* design manual. The maximum allowable capacity of a roadway section varies depending on the calculated slope of the street from node to node. Actual capacities can be found in the McFarland Street Flow Analysis spreadsheet located in Appendix B. Refer to Table 2-2 for the design protection levels associated with the 10- and 100-year conditions.

All storm drain pipes were modeled within FlowMaster and the maximum full flow capacities of the pipes were calculated. The peak flows from AES, street flow capacities from FlowMaster, and pipe capacities were all entered into a street flow calculation spreadsheet in Excel. The spreadsheet was organized according to sub area designations and hydrology node numbers. Street flows between each node were determined by subtracting the storm drain full flow capacity (FlowMaster) from the calculated hydrology peak flows (AES). Street capacity deficiencies were identified where the calculated street flows exceeded the maximum allowable flow rates for each section.

All pipes are labeled in the same format described in Section 5.1.2.

Street design protection levels and flooded widths for each tributary area were looked at first. Street deficiencies were identified when the runoff flowing along the street exceeded the maximum allowable values. Once this process was completed for all street sections in the tributary areas, the existing storm drain sizes were analyzed next. This process was carried out for both the 10- and 100-year conditions.

5.2.2.1 10-Year Existing Street and Storm Drain Analysis

The most significant areas of flooding occur on Browning Road, south of Perkins Avenue, and along Perkins Avenue from Industrial Street to San Pedro Street. Runoff south of Sherwood Avenue is conveyed to the east side of Browning Road from a cross gutter at Browning Road and Sherwood Avenue. Half street widths on Browning Road were assumed for sub areas J4 and J14 as no cross gutters were seen connecting the east curb and gutter to the west curb and gutter. Flooding on Perkins Avenue begins at the intersection with San Pedro Street. Storm runoff from the area east of San Pedro Street converges at the San Pedro-Perkins intersection. This flow, combined with the runoff flowing north from the southern portion of the East Watershed, inundate the catch basin and existing storm drain system at Browning Road.

Based on the 10-year street deficiency criteria listed in Table 2-2, a total of 6 street sections experienced flooding above the maximum allowable capacity. Deficient street sections for the 10-year condition are listed in Table 5-14.

Table 5-14: East Watershed Street Deficiencies Per Max Allowable Flow (10-Year)

Street Deficiencies Per Max Allowable Flow (10-Year)			
Downstream Node	Sub Area	Street Type	Overflow Maximum (cfs)
Tributary Area J			
203	J3	Collector	8
204	J4	Collector	15
216*	J14	Collector	17, 5*
227	J18	Collector	36
Tributary Area K			
243	K3	Primary (4)	2

* Flooding occurs on Perkins Avenue from Node 204 to 216 and Perkins Avenue from Node 215 to 216.

In addition to calculating the maximum allowable flow for each street type based on Kern County criteria, the maximum street capacity was calculated also. This assumes that the street sections are completely flooded up to the right-of-way limits. All six of the street sections labeled as deficient did not have flows that exceeded the maximum street capacity.

As most of the flow makes its way to the sump basin via street and gutter flow, there are only two pipes that were identified in the East Drainage Area. The first pipe (McF_216-227_EX) begins at a catch basin at the northwest corner of the Perkins Avenue-Browning Road intersection and discharges into a trapezoidal channel at the Perkins Avenue access ramp. The second pipe (McF_235-236_EX) begins at a catch basin on the south side of Brentwood Court and discharges into the sump basin. Refer to Figure 5-1 for the location of the existing storm drain systems in the East Watershed.

The storm drain pipe systems have been analyzed in conjunction with the street flow analysis to identify areas in which the existing pipes are undersized and do not convey enough flow to alleviate the street flooding. The Bentley FlowMaster program was used to determine the full flow capacity of each section of pipe, as well as the capacity of the trapezoidal channel. Of the two existing pipes in the East Drainage Area; one was determined to be deficient in size. A summary of the existing pipe deficiency is listed in Table 5-15. Existing storm drain pipe deficiencies in the East Watershed for the 10-year condition can be seen in Figure 5-5.

Table 5-15: East Watershed Pipe Deficiencies (10-Year)

Existing Pipe Deficiencies (10-Year)			
Existing Pipe Label	Existing Size	Full Flow Capacity (cfs)	Overflow (cfs)
Tributary Area J			
McF_216-227_EX	24"	10.1	36

The concrete trapezoidal channel, which begins at the entrance of the Perkins Avenue access ramp to Highway 99 and ends at the sump basin, is about 420 feet long and has been assumed to have a slope of 0.2%. In the 10-year condition, a peak flow of 82.3 cfs passes through the channel, which is less than the channel capacity of 97.4 cfs. Hydraulics calculations for the existing pipes and channel can be found in Appendix B.

The ultimate goal in improving the existing condition is to attempt to eliminate all locations which experience flooding in addition to meeting street deficiency criteria. Proposed improvements for the 10-year hydrologic condition can be found in Section 5.2.3.1.

5.2.2.2 10-Year Existing Sump Basin Analysis

Analysis of the existing sump basin within the East Watershed was completed according to the methodology outlined in Section E of the Kern County Hydrology Manual. The same process outlined in Section 5.1.2.2 for the West Watershed, was followed for the basin in the East Watershed. Information was collected from the rational method hydrology performed for the area and a runoff hydrograph was produced. The Y bar values were computed using the equations listed in Section C.7.1 and C.7.2 of the Kern County Hydrology Manual and can be found in Appendix C.

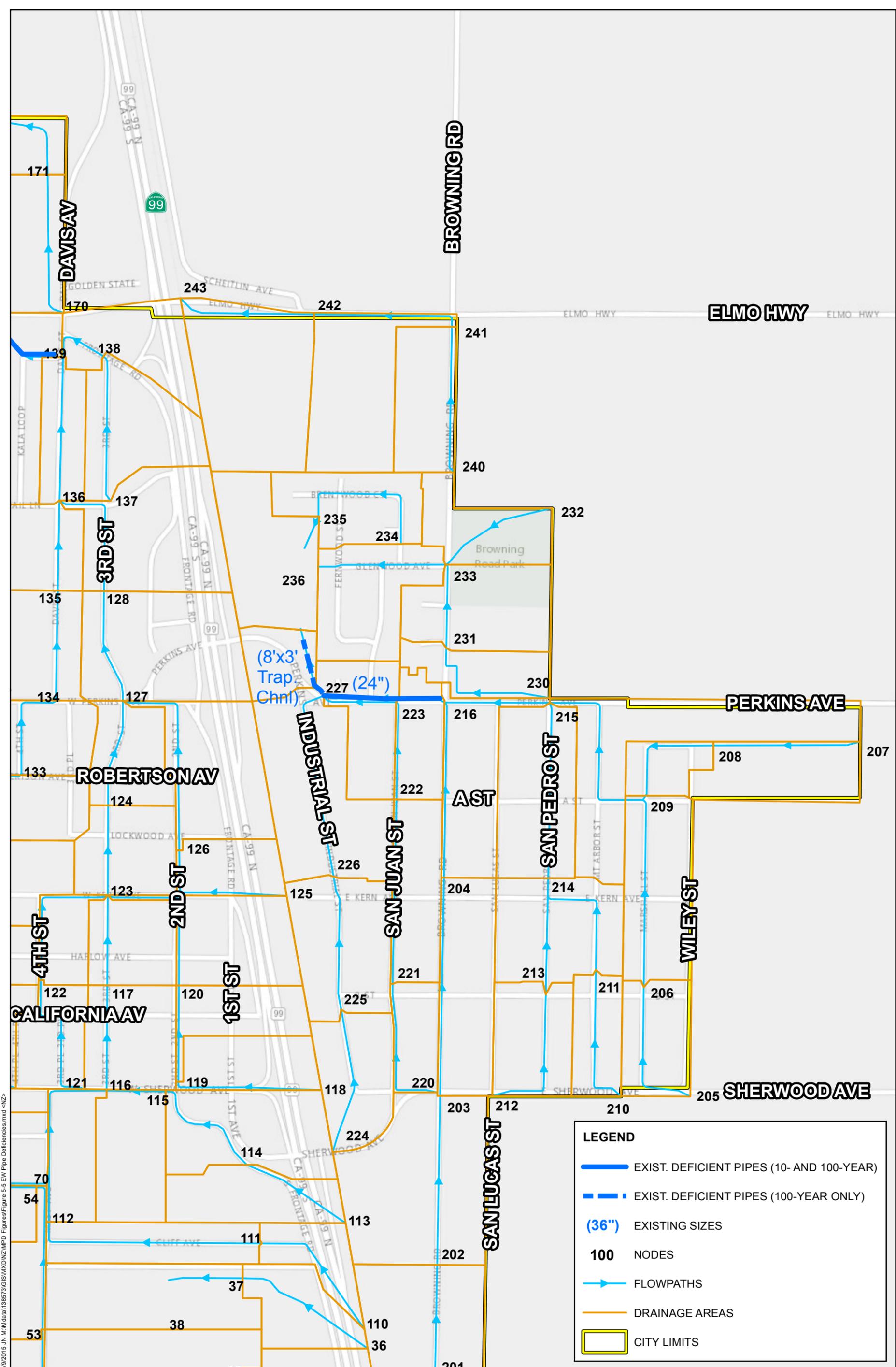
A stage storage curve was developed for the basin by relating the depth of water in the basin with the capacity volume. As there was no As-Built information about the design capacity of the sump basin, the capacity was assumed.

The AES FloodSCx 2013 Routing Program was used to generate results for the sump basin. The complete AES Flood Routing output for the basin can be found in Appendix C.

In the East Watershed, Sump Basin J was found to be adequately sized for the 10-year storm event. The total inflow volume was well below the maximum capacity of the basin. The basin capacity, inflow volume, and overflow volume is listed in Table 5-16.

Table 5-16: East Watershed Sump Basin (10-Year)

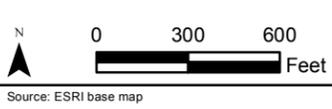
East Watershed Existing Sump Basin (10-Year)			
Basin Label	Basin Capacity (acre-ft)	Inflow Volume (acre-ft)	Overflow (acre-ft)
Basin J	66.39	28.2	-



2/9/2015 11:41:13 AM \\data1\38573\GIS\MXD\MZ\MZ\MPD\Figures\Figure 5-5 E/W Pipe Deficiencies.mxd <N>

LEGEND

- EXIST. DEFICIENT PIPES (10- AND 100-YEAR)
- - - EXIST. DEFICIENT PIPES (100-YEAR ONLY)
- (36") EXISTING SIZES
- 100** NODES
- FLOWPATHS
- DRAINAGE AREAS
- CITY LIMITS



Source: ESRI base map

EAST WATERSHED EXISTING PIPE DEFICIENCIES

MCFARLAND MASTER PLAN OF DRAINAGE

FIGURE 5-5

5.2.2.3 100-Year Existing Street and Storm Drain Analysis

In the 100-year condition, two additional street sections are flooded as compared to the 10-year condition. All eight street sections identified as being deficient are shown in Table 5-17.

Table 5-17: East Watershed Street Deficiencies Per Max Allowable Flow (100-Year)

Street Deficiencies Per Max Allowable Flow (100-Year)			
Downstream Node	Sub Area	Street Type	Overflow Maximum (cfs)
Tributary Area J			
202	J2	Collector	9
203	J3	Collector	23
204	J4	Collector	32
216*	J14	Collector	34, 37*
227	J18	Collector	90
Tributary Area K			
242	K2	Primary (4)	8
243	K3	Primary (4)	15

* Flooding occurs on Garzoli Avenue from Node 87 to 98 and Perkins Avenue from Node 95 to 98.

Similar to the 10-year existing condition hydraulics calculations, street sections with flows exceeding that of the maximum capacity were also identified for the 100-year existing condition. Of the eight street sections that experienced flooding, one was found to have flooding that would stretch beyond the right-of-way limits of the street. The amount of flow conveyed over the right-of-way limit can be seen in Table 5-18.

Table 5-18: East Watershed Street Deficiencies Exceeding Max Capacity Flow (100-Year)

Street Deficiencies Exceeding Max Capacity Flow (100-Year)			
Downstream Node	Sub Area	Street Type	Max Capacity Overflow (cfs)
Tributary Area J			
227	J18	Collector	22

The flooding along Perkins Avenue in sub areas J17 and J18 is a result of the large amount of storm water converging at these areas, as well as the undersized 24-inch pipe that discharges into the trapezoidal channel at Node 227. Upsizing of the existing pipe is necessary to reduce flooding in both the 10- and 100-year conditions. The trapezoidal channel which was not deficient in the 10-year condition is undersized in the 100-year condition. The channel is only able to convey 97.4 cfs of the 149.4 cfs that flows to the sump basin at this location.

The pipe discharging at the north end of the basin (McF_235-236_EX) was also analyzed for full flow capacity. In the 100-year condition it was determined that the pipe was adequately sized. A summary of the existing pipe and channel deficiencies for the 100-year condition is listed in Table 5-19. Existing storm drain systems in the East Watershed can be seen in Figure 5-1. Existing storm drain pipe deficiencies in the East Watershed for the 100-year condition can be seen in Figure 5-5.

Table 5-19: East Watershed Pipe Deficiencies (100-Year)

Existing Pipe & Channel Deficiencies (100-Year)			
Existing Pipe Label	Existing Size	Full Flow Capacity (cfs)	Overflow (cfs)
Tributary Area J			
McF_216-227_EX	24"	10.1	90
McF_227-236_EX	8'(W) x 3'(H) Trap Chnl	97.35	52.03

Upgrading the existing systems to meet 100-year flows requires some of the same improvements required in the 10-year condition such as increasing pipe sizes to convey more flow to the sump basin and extending storm drain lines farther upstream to reduce flooding. Proposed improvements for the 100-year hydrologic condition can be found in Section 5.2.3.2.

5.2.3 Proposed Improvements

Improvements to the existing drainage systems consisted primarily of upsizing existing storm drain facilities and extending existing storm drain systems farther upstream to the areas of flooding. All proposed improvements have been designed with the goal of reducing the amount of flow the street roadways convey. By capturing the surface flow on the streets via catch basins, and conveying it as pipe flow, the deficient areas identified in Section 5.2.2, will meet Kern County Flood Protection criteria.

The proposed improvements in the following sub-sections assume that the roadway sections within the City will remain as they are. Improvements to street geometries or increases in street grades will allow the street sections to convey more flow without being labeled as deficient. However, analysis of existing and proposed storm drain systems should always be completed in order to verify that correct storm drain pipe sizes are installed.

Areas in which there are no As-Built plans available, the pipes are assumed to have a slope parallel to that of the road surface. Road surface slopes have been extracted from As-Built plans or assumed from Kern County topography.

The storm drain pipe improvements proposed in the following sections are assumed to be flowing at full capacity. Analysis of proposed catch basins has not been included in this report. It has been assumed that the City will install the correct configuration of catch basins in order to fill the pipes to their design capacities.

5.2.3.1 10-Year Proposed Hydraulic Analysis

A storm drain line is proposed from the existing catch basin at the Browning Road-Perkins Avenue intersection, south, to the Browning Road-Sherwood Avenue intersection. The proposed pipe sizes for this line are 24-inch and 30-inch pipes. The 30-inch pipes would extend the length of Browning Road in sub areas J4 and J14. At Node 203, the pipe would be downsized to a 24-inch pipe, and would extend to Node 202. Proposed storm drain pipe sizes can be seen in Table 5-20. Refer to Figure 5-6 for the location of the 10-year proposed systems.

Another pipe that will tie-in to the existing system is a 24-inch pipe from the existing catch basin to the San Pedro-Perkins intersection. This pipe will alleviate flooding on Perkins Avenue between Browning Road and San Pedro Street.

As a large portion of runoff from the East Watershed converges at the catch basin on Perkins Avenue, and the proposed system extension includes a 30-inch pipe upstream of the existing system, the current pipe will be upsized. A proposed 48-inch pipe will have the capacity to handle flow originating from the

southern portion of the East Watershed. However, it was observed from Google Earth that cover above the existing pipe is minimal. Due to the limited cover above the existing pipe, a 5.5-foot wide by 2-foot high box has been suggested. Refer to Table 5-21 for the upsizing of the existing pipe. Proposed storm drain systems in the East Watershed for the 10-year condition can be seen in Figure 5-6.

Table 5-20: East Watershed Additional Proposed Pipes (10-Year)

Proposed Pipes to Tie-In To Existing Systems (10-Year)			
Proposed Pipe Label	Size	Full Flow Capacity (cfs)	Location
Tributary Area J			
McF_202-203_PR	24"	10.12	Browning Road
McF_203-204_PR	30"	18.34	Browning Road
McF_204-216_PR	30"	18.34	Browning Road
McF_215-216_PR	24"	10.12	Perkins Avenue

Table 5-21: East Watershed Proposed Upsizing of Existing Pipes (10-Year)

Proposed Upsizing of Existing Pipes (10-Year)				
Existing Pipe Label	Existing Size	Proposed Pipe Label	Proposed Size	Max Proposed Flowrate (cfs)
Tributary Area J				
McF_216-227_EX	24"	McF_216-227_PR	48" or 5.5'(W) x 2'(H) Box	64.24, 45.73

5.2.3.2 100-Year Proposed Hydraulic Analysis

As previously mentioned in Section 5.2.2.3, there were eight streets that were flooded in the 100-year condition. There is a significant increase in runoff in the 100-year condition which requires the system in Perkins Avenue to extend farther upstream than the proposed 10-year condition. A total of five pipes are proposed and are listed in Table 5-22. All proposed improvements to the East Watershed storm drain systems for the 100-year condition can be seen in Figure 5-7.

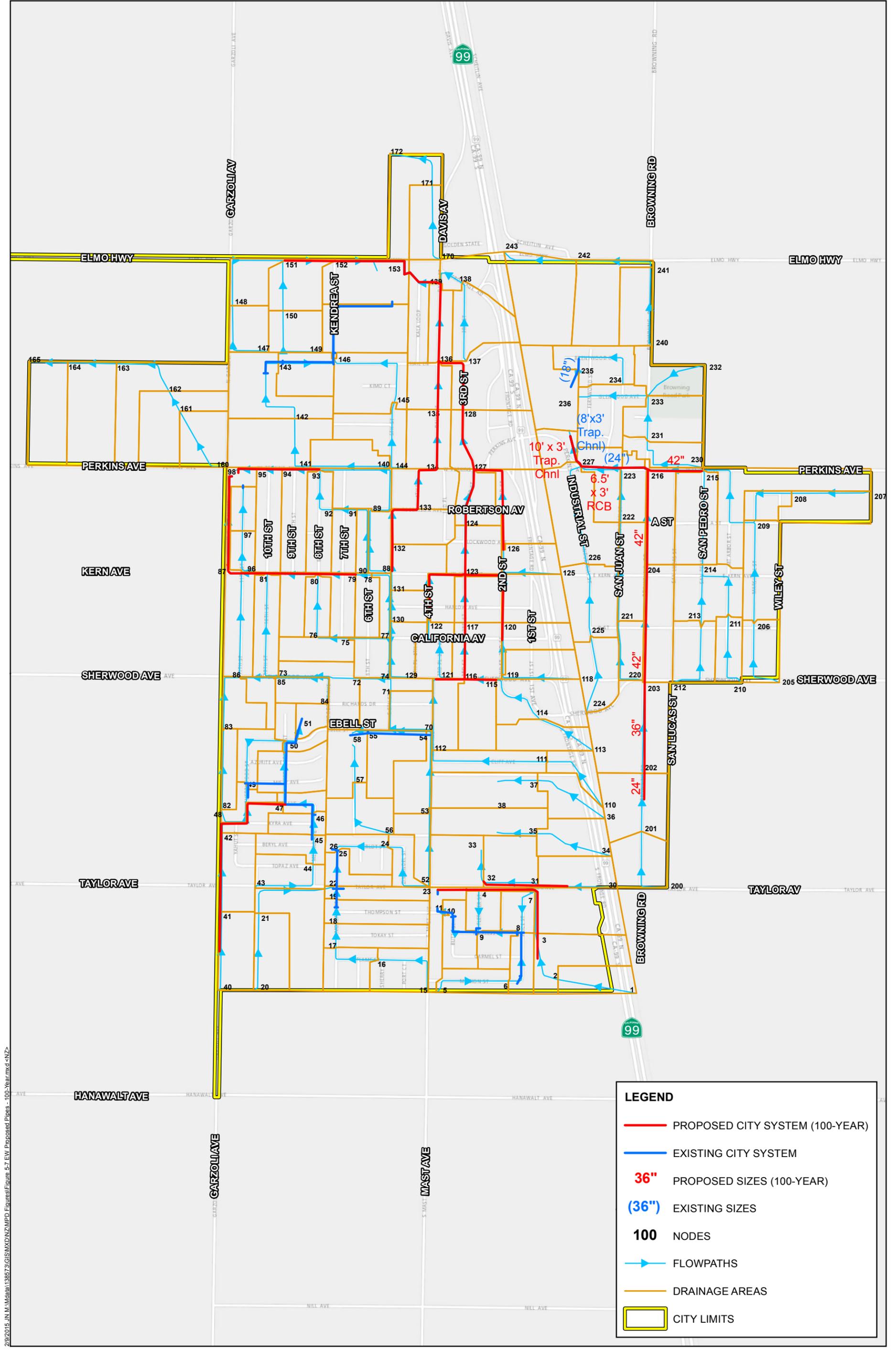
Table 5-22: East Watershed Additional Proposed Pipes (100-Year)

Proposed Pipes to Tie-In To Existing Systems (100-Year)			
Proposed Pipe Label	Size	Full Flow Capacity (cfs)	Location
Tributary Area J			
McF_201-202_PR100	24"	10.12	Browning Road
McF_202-203_PR100	36"	18.34	Browning Road
McF_203-204_PR100	42"	18.34	Browning Road
McF_204-216_PR100	42"	18.34	Browning Road
McF_215-216_PR100	42"	18.34	Perkins Avenue

The proposed upsizing of the pipe in Perkins Avenue, for the 10-year condition, would be too small to convey the necessary amount of flow in the 100-year condition. The peak flow rate that the storm drain system must convey between Node 216 and Node 227 is 120-cfs. A 60-inch diameter pipe would be capable of handling that flow; however, as mentioned before, the cover between the existing pipe and finished grade is very small. Instead, a 6.5-foot wide by 3-foot high box is proposed. This box would convey about 100-cfs and the remaining runoff can be conveyed by the existing gutters. The existing 8' wide by 3' high trapezoidal is also undersized to convey the 149.38-cfs seen at the outlet location into the basin. By widening the base width of the channel from 2 feet to 4 feet, the channel will convey the required flow. The existing pipe and channel to be upsized and in the 100-year condition is listed in Table 5-23.

Table 5-23: East Watershed Proposed Upsizing of Existing Pipes (100-Year)

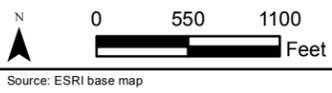
Proposed Upsizing of Existing Pipes (100-Year)				
Existing Pipe Label	Existing Size	Proposed Pipe Label	Proposed Size	Max Proposed Flowrate (cfs)
Tributary Area J				
McF_216-227_EX	24"	McF_216-227_PR100	6.5'(W) x 3'(H) Box	101.42
McF_227-236_EX	8'(W) x 3'(H) Trap Chnl	McF_227-236_PR100	10'(W) x 3'(H) Trap Chnl	151.82



2/9/2015 10:11:00 AM \\ms01\GIS\MXD\N\Z\M\PD\Figures\Figure 5-7 EW Proposed Pipes - 100-Year.mxd <N>

LEGEND

- PROPOSED CITY SYSTEM (100-YEAR)
- EXISTING CITY SYSTEM
- 36" PROPOSED SIZES (100-YEAR)
- (36") EXISTING SIZES
- 100** NODES
- FLOWPATHS
- DRAINAGE AREAS
- CITY LIMITS



MCFARLAND MASTER PLAN OF DRAINAGE

EAST WATERSHED PROPOSED PIPES (100-YEAR)

FIGURE 5-7

5.2.4 Cost Estimates

Cost estimates for the East Watershed have been completed for all proposed improvements in the 10- and 100-year conditions. The grouping of all Sub Areas remains consistent with the grouping within the Proposed Facilities exhibits. Table 5-24 gives a summary of the construction cost estimates for the 10-year condition and Table 5-25 for the 100-year condition. See Appendix D for detailed cost estimates.

Table 5-24: East Watershed Cost Estimate Summary (10-Year)

Sub Area	Existing Size	Proposed Size	Total Project Cost (2014 \$)	Notes
East Watershed-Sub Area K				
K	18"-24", 8'x3' Trap. Chnl	24"-30", 5.5'x2' RCB	\$3,488,000	New storm drain
Total			\$3,488,000	-
West and East Watershed: 10-Year Storm Event (Refer to Table 5-12 for West Watershed Cost Estimate)				
Grand Total			\$12,150,000	-

Table 5-25: East Watershed Cost Estimate Summary (100-Year)

Sub Area	Existing Size	Proposed Size	Total Project Cost (2014 \$)	Notes
East Watershed-Sub Area K				
K	18"-24", 8'x3' Trap. Chnl	24"-42", 6.5'x3' RCB, 10'x3' Trap. Chnl	\$3,973,000	New storm drain
Total			\$3,973,000	-
West and East Watershed: 100-Year Storm Event (Refer to Table 5-13 for West Watershed Cost Estimate)				
Grand Total			\$15,780,000	-

6 Summary of Findings and Recommendations

There are three main factors that contribute to the local flood problems in the City of McFarland. These include: undersized sump basins, undersized storm drain systems, and the absence of storm drain systems in areas where there are large volumes of runoff. All proposed improvements outlined in this report have been designed to work in conjunction with each other. This means that for a given storm drain system; the improvements made to that system are sized so that each section of pipe has sufficient capacity to handle the flows coming from the upstream end of the system.

Analysis of the storm drain systems in the both the East and West Watershed only considers the local runoff that is produced from the 10- and 100-year storms. None of the regional overflow of Poso Creek and the canal levee was considered when sizing the proposed systems. In order to analyze a scenario in which City storm drain systems could convey both local and regional runoff, a more comprehensive study should be conducted. The current FEMA studies for the area do not provide enough detailed information regarding the amount of flow entering the City from the ponding along the SR-99 Highway and canal breach scenario. It should be noted that the addition of regional flows into the existing and proposed systems discussed in this report could result in larger basin and pipe sizes being needed than those recommended in this study.

Priority for which tributary areas should be improved first should be given to the areas in which flooding is the heaviest, starting with the 10-year condition. These include the streets listed in Table 5-6 and Table 5-18. These street sections were identified as having flows exceeding the maximum capacity of the sections. The overflow along these sections exceeds the right-of-way limits. Next, would be improving all street sections to meet the Kern County flood criteria in Table 2-2 for the 10-year condition. Improvements made to address the 100-year flooding cases should also follow the same procedure just mentioned. Focus on the areas with the greatest street deficiencies first, and then look at improving the rest of the streets that may also be deficient but in a somewhat lesser manner.

The proposed improvements discussed in this section follow a downstream to upstream approach. The facilities located the furthest downstream (i.e. the sump basins) should be improved first, then the existing pipes should be upsized to handle the upstream flow rates, and finally, the addition of new pipes upstream of the existing systems can be added to alleviate the street flooding.

Four of the nine sump basins were found to be deficient in size for the 10-year condition. Sump Basins B, C1, D2, and E, all had inflow volumes that exceeded the maximum allowable capacities as summarized in Table 5-4. Increasing the design capacities of these sump basins is recommended before any other improvements are made to the storm drain systems in the area. It has been proposed that the four deficient sump basins in the West Watershed, either be increased in area, or increased in depth to provide a greater design capacity. For Basin C1, a connection to Basin C2 could also be made in which the overflow would be redirected to the latter basin, which has sufficient capacity. Once the sump basins are appropriately sized, improvements to the existing systems discharging into the basins can begin. In areas where the basins are already capable of handling the runoff volume from the tributary area, improvements to the existing systems can occur first.

Increases in pipe sizes are necessary for most of the existing storm drain systems in the City. The proposed pipes for all systems have been sized to convey enough flow to alleviate surface flooding in the streets, as well as the full flow coming from the upstream sections of the system. Once the upsizing of the downstream pipes is completed, work can begin on the addition of pipes at the upstream ends of the pipe network.

7 Implementation Program and CIP Schedule

7.1 Prioritization Criteria

A priority ranking was developed for all proposed facilities. The goal of the priority ranking system is to determine the projects of greatest importance and determine which projects should be constructed first when funding becomes available. These priorities are summarized below:

- **Priority 1**
 - **Existing Retention Basins:** Existing basins which do not have the capacity to retain runoff from the 10-year storm event.
 - **Local Streets:** Existing streets and storm drain systems where flood depth is above the right-of-way in the 10-year event. Additionally, existing storm drain systems for which the recommended pipe size is 12 inches or larger than the existing storm drain size.
 - **Arterial Streets:** Existing streets and storm drain systems where flood depth is above the right-of-way in the 10-year event. Additionally, existing storm drain systems for which the recommended pipe size is 12 inches or larger than the existing storm drain size.
- **Priority 2**
 - **Local Streets:** Existing storm drain systems do not achieve the 10-year flood protection level (Maximum allowable depth is exceeded).
 - **Arterial Streets:** Existing storm drain systems do not achieve the 10-year flood protection level (Maximum allowable depth is exceeded).
- **Priority 3**
 - **Local Streets:** Existing storm drain systems do not achieve 100-year flood protection level (flooded depth is above the right-of-way).
 - **Arterial Streets:** Existing storm drain systems do not achieve 100-year flood protection level (flooded depth is above the right-of-way).

The process of assigning priorities to each proposed segment is as follows:

1. The magnitude of overflow at every node (in the existing condition) is sorted into either Priority 1, 2, or 3 based on the depth associated with each overflow value within a typical street cross section. The magnitudes of the overflow and the supporting information can be found in Appendix B.
2. If any sump basin at the outlet of the existing storm drain systems did not have the capacity to retain the full runoff volume of the 10-year event, the basin was assigned Priority 1.
3. All priority assignments are then extrapolated from upstream to downstream with the higher priority taking precedence. For example, if the main line begins with a Priority 2 assignment, this same priority is then assigned downstream until it reaches a Priority 1 assignment. At this point, the main line is assigned Priority 1 to the end of the system downstream.
4. Any segments which have proposed improvements for the 100-year condition only, and that have not been included in steps 1-3, have not been assigned a priority.
5. Note that any facilities which do not require upsizing have no priority assignment.

7.2 Storm Drain Prioritization

Table 7-1 summarizes the priorities assigned to each storm drain segment for which a recommended improvement was proposed.

Table 7-1: Prioritization of Pipes to be Improved

Proposed Upsizing Priority						
Drainage Area	Upstream-Downstream Node	Existing Size	Proposed Size (10-Year)	Proposed Size (100-Year)	Street	Priority
Tributary Area A						
A3	3-4	-	18"	30"	Taylor Avenue	2
A10	4-11	-	18"	30"	Taylor Avenue	2
Tributary Area C						
C2	31-32	-	18"	30"	Taylor Avenue	2
Tributary Area E						
E11	80-81	-	24"	30"	Kern Avenue	2
E16	81-87	-	30"	42"	Kern Avenue	2
E22	93-94	-	18"	30"	Perkins Avenue	2
E23	94-95	-	18"	30"	Perkins Avenue	2
E24	87-98	24"	36"	48"	Garzoli Avenue	1
E24	95-98	-	18"	30"	Perkins Avenue	2
Tributary Area F						
F6	115-116	-	18"	30"	Sherwood Avenue	2
F7	116-117	-	18"	30"	Sherwood Avenue	2
F8	117-123	-	18"	30"	Sherwood Avenue	2
F11	120-123	-	24"	30"	2 nd Street	2
F14	123-124	-	30"	42"	3 rd Street	1
F15	124-127	-	36"	42"	3 rd Street	1
F17	126-127	-	18"	30"	2 nd Street	2
F18	127-128	-	42"	48"	3 rd Street	1
F19	128-136	-	42"	48"	3 rd Street	1
F23	132-133	-	-	24"	5 th Street	3
F24	133-134	-	-	24"	Robertson Avenue	3
F25	134-135	-	-	24"	Davis Road	3
F26	135-136	-	-	24"	Davis Road	3
F27	136-139	-	42"	48"	Davis Road	1
F30	139-153	24"	42"	48"	Kala Loop	1
F41	151-152	-	18"	24"	Elmo Highway	2
F42	152-153	18"	-	24"	Elmo Highway	3
Tributary Area J						
J3	202-203	-	24"	36"	Browning Road	2
J4	203-204	-	30"	42"	Browning Road	2

Proposed Upsizing Priority						
Drainage Area	Upstream-Downstream Node	Existing Size	Proposed Size (10-Year)	Proposed Size (100-Year)	Street	Priority
J14	204-216	-	30"	42"	Browning Road	2
J14	215-216	-	24"	42"	Perkins Avenue	2
J18	216/223-227	24"	48" RCP or 5.5' (W) x 2' (H) Box	6.5' (W) x 3' (H) Box	Perkins Avenue	1
Tributary Area K						
K3	242-243	-	18"	30"	Elmo Highway	3

APPENDIX A

FEMA-LOMR 11-09-0622P

Existing Conditions Hydrology Calculations



Federal Emergency Management Agency

Washington, D.C. 20472

DEC 20 2010

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Manuel Cantu, Jr.
Mayor, City of McFarland
401 Kern Street
McFarland, CA 93250

IN REPLY REFER TO:

Case No.: 11-09-0622P
Community Name: City Of McFarland, CA
Community No.: 060080
Effective Date of
This Revision: December 20, 2010

Dear Mayor Cantu:

The Flood Insurance Rate Map for your community has been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7175, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Sincerely,

Beth A. Norton, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

For: Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map

cc: Mr. Ray Watson
Chairman, Board of Supervisors
Kern County, CA
1115 Truxtun Avenue, 5th Floor
Bakersfield, CA 93301

Mr. Charles Lackey
Kern County
2700 "M" Street
Suite 570
Bakersfield, CA 93301-2370

Mr. Ernie Kartinen
AECOM
5001 E Commerce Center Drive
Bakersfield, CA 93309



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City Of McFarland Kern County California	NO PROJECT	MAP UPDATE
	COMMUNITY NO.: 060080		
IDENTIFIER	City Of McFarland East & West Side	APPROXIMATE LATITUDE & LONGITUDE: 35.678, -119.228 SOURCE: Other DATUM: NAD 83	
ANNOTATED MAPPING ENCLOSURES		ANNOTATED STUDY ENCLOSURES	
TYPE: FIRM*	NO.: 06029C0740E	NO REVISION TO THE FLOOD INSURANCE STUDY REPORT	
TYPE: FIRM*	NO.: 06029C0750E		

Enclosures reflect changes to flooding sources affected by this revision.

* FIRM - Flood Insurance Rate Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Friant-Kern Canal - Approximately 2,000 feet downstream of Elmo Highway to approximately 1,500 feet upstream of Highway 99.

Unnamed Ponding area along Highway 99 Corridor - from just downstream of Phillips Road to just upstream of Elmo Highway.

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Friant-Kern Canal	Zone A	Zone X (shaded)	YES	NONE
	Zone A	Zone A	NONE	YES
Unnamed Ponding area along Highway 99 Corridor	Zone A	Zone X (shaded)	YES	NONE
	Zone A	Zone A	NONE	YES

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 6730 Santa Barbara Court, Elkridge, MD 21075. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Beth A Norton

Beth A. Norton, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency
Washington, D.C. 20472

**LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)**

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 060075 **Name:** Kern County, California

AFFECTED MAP PANELS

TYPE: FIRM*	NO.: 06029C0740E	DATE: September 26, 2008
TYPE: FIRM*	NO.: 06029C0750E	DATE: September 26, 2008

AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT

NO REVISION TO THE FLOOD INSURANCE STUDY REPORT

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 6730 Santa Barbara Court, Elkridge, MD 21075. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Beth A. Norton

Beth A. Norton, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 6730 Santa Barbara Court, Elkridge, MD 21075. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Beth A. Norton

Beth A. Norton, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency
Washington, D.C. 20472

**LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)**

COMMUNITY INFORMATION (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 6730 Santa Barbara Court, Elkridge, MD 21075. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Beth A. Norton

Beth A. Norton, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency
Washington, D.C. 20472

**LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)**

COMMUNITY INFORMATION (CONTINUED)

This revision is effective as of the date of this letter. Any requests to review or alter this determination should be made within 30 days and must be based on scientific or technical data.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 6730 Santa Barbara Court, Elkridge, MD 21075. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Beth A. Norton

Beth A. Norton, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was derived from USDA - Farm Service Agency - Aerial Photography Field Office dated 2005 and from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1992 or later.

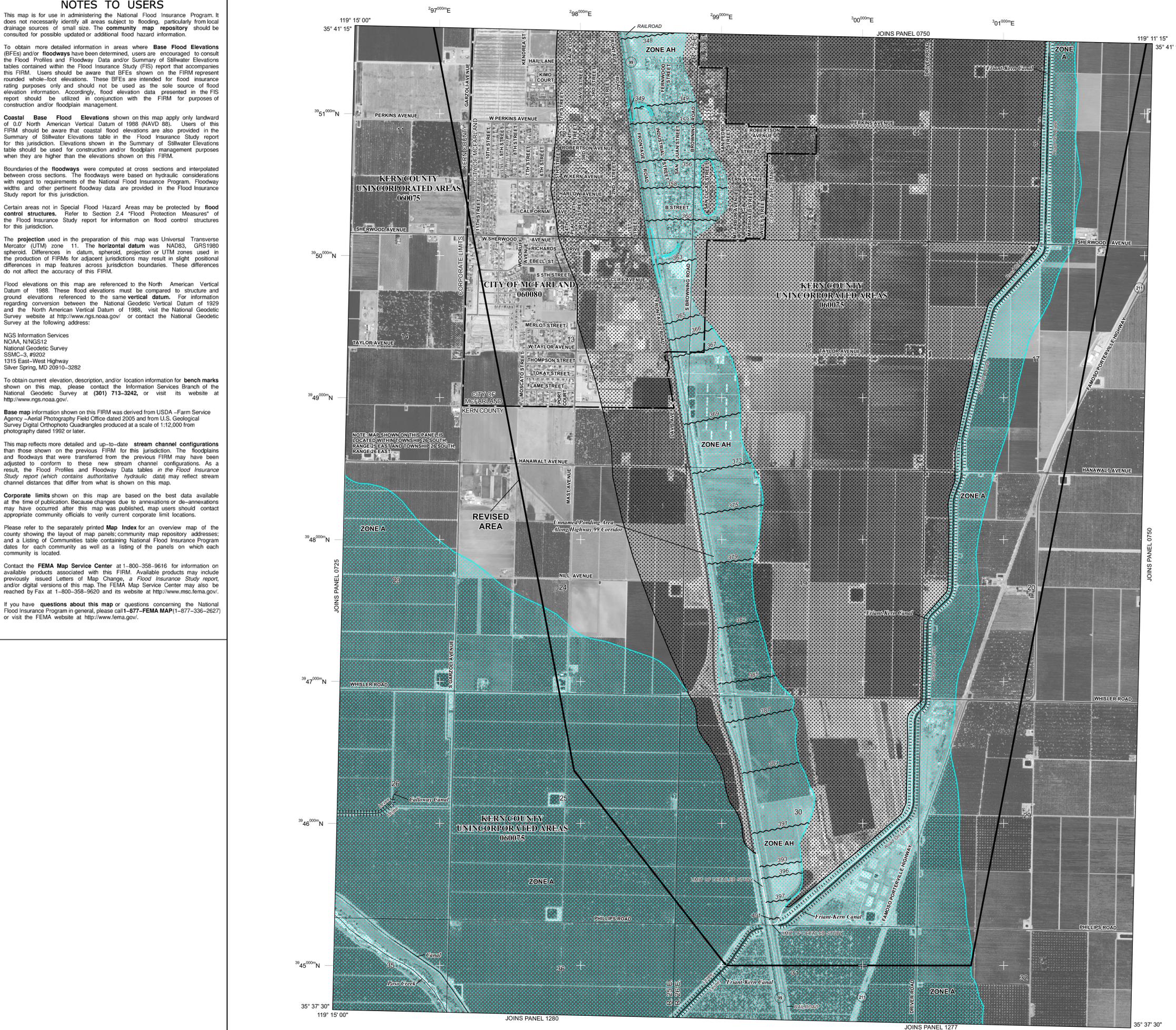
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

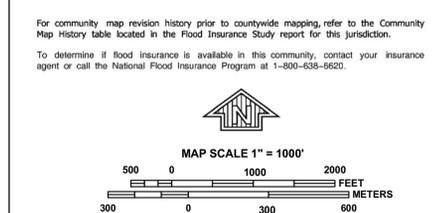
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/>.



LEGEND

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A**
No Base Flood Elevations determined.
- ZONE AE**
Base Flood Elevations determined.
- ZONE AH**
Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO**
Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR**
Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently deteriorated. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99**
Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V**
Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE**
Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS
- ZONE X**
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS
- ZONE D**
Areas determined to be outside the 0.2% annual chance floodplain. Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet* (EL 987)
- Base Flood Elevation value where uniform within zone; elevation in feet*
- * Referenced to the North American Vertical Datum of 1988 (NAVD 88)
- Cross section line
- Transect line
- 97°07'30", 32°22'30"
42°75'00"N
6000000 M
DX5510
M1.5
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid ticks, zone 11
- 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- MAP REPOSITORIES
Refer to Map Repositories list on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL



PANEL 0740E

FIRM
FLOOD INSURANCE RATE MAP
KERN COUNTY,
CALIFORNIA
AND INCORPORATED AREAS

PANEL 740 OF 4125
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

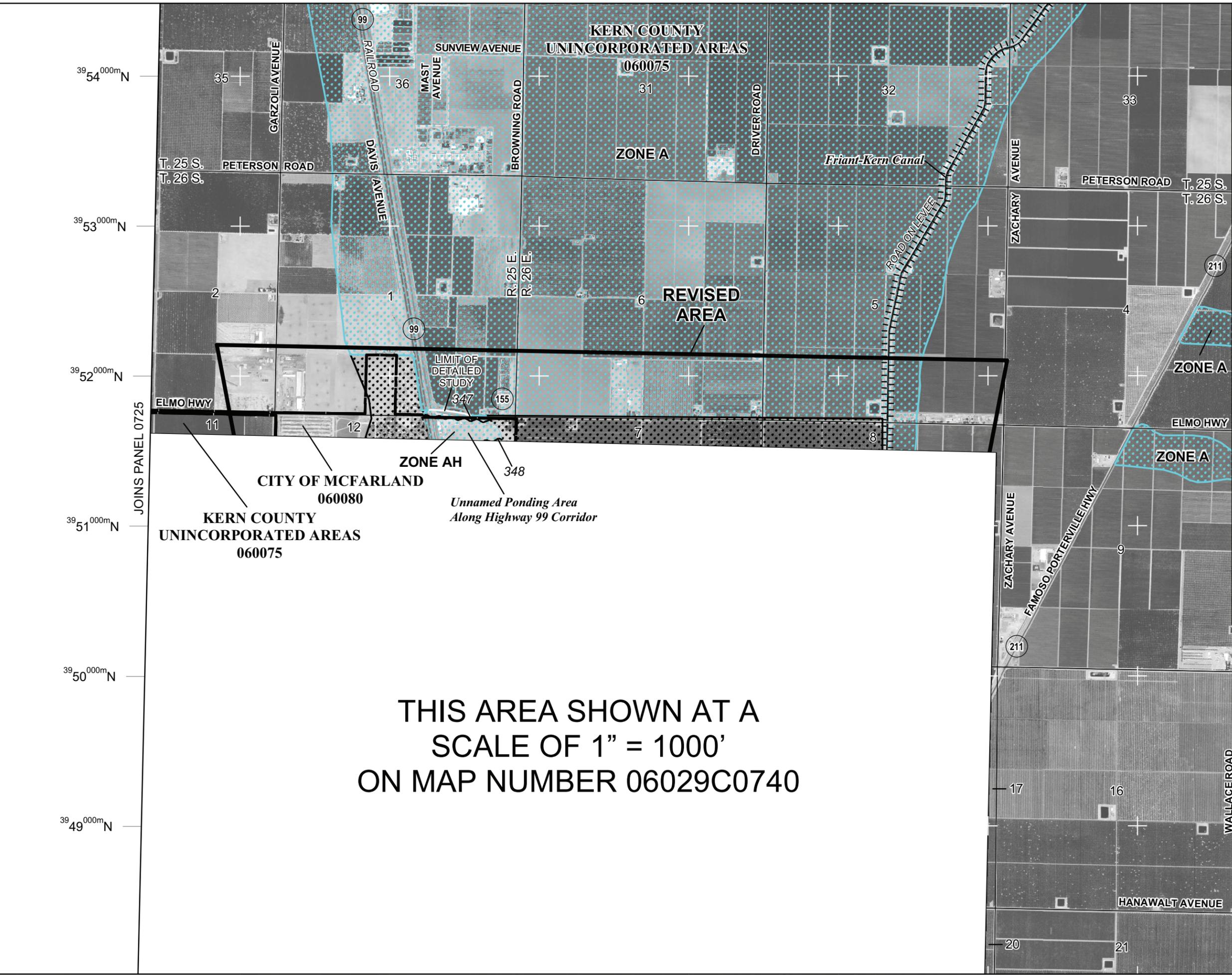
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KERN COUNTY	060075	0740	E
MC FARLAND, CITY OF	060080	0740	E

REVISED TO REFLECT LOMR EFFECTIVE: December 20, 2010

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06029C0740E
EFFECTIVE DATE
SEPTEMBER 26, 2008
Federal Emergency Management Agency



Legend

- 1% annual chance (100-Year) Floodplain
- 1% annual chance (100-Year) Floodway
- 0.2% annual chance (500-Year) Floodplain

MAP SCALE 1" = 2000'

1000 0 2000 FEET METERS

NFP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0750E

FIRM

FLOOD INSURANCE RATE MAP

KERN COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 750 OF 4125
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KERN COUNTY	060075	0750	E
DELANO, CITY OF	060078	0750	E
MCFARLAND, CITY OF	060080	0750	E

REVISED TO REFLECT LOMR EFFECTIVE: December 20, 2010

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 06029C0750E

EFFECTIVE DATE SEPTEMBER 26, 2008

Federal Emergency Management Agency

ELMO HWY

11 12

CITY OF MCFARLAND 060080

KERN COUNTY UNINCORPORATED AREAS 060075

ZONE AH

347 348

Unnamed Ponding Area Along Highway 99 Corridor

THIS AREA SHOWN AT A SCALE OF 1" = 1000' ON MAP NUMBER 06029C0740



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.518
SUBAREA AREA (ACRES) = 13.33 SUBAREA RUNOFF (CFS) = 5.41
EFFECTIVE AREA (ACRES) = 20.99 AREA-AVERAGED Fm (INCH/HR) = 0.34
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.50
TOTAL AREA (ACRES) = 21.0 PEAK FLOW RATE (CFS) = 8.73

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.52 HALFSTREET FLOOD WIDTH (FEET) = 19.80
FLOW VELOCITY (FEET/SEC.) = 1.18 DEPTH*VELOCITY (FT*FT/SEC.) = 0.61
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 1724.00 FEET.

FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 363.00 DOWNSTREAM ELEVATION (FEET) = 362.50
STREET LENGTH (FEET) = 1265.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.87
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.66
HALFSTREET FLOOD WIDTH (FEET) = 20.00
AVERAGE FLOW VELOCITY (FEET/SEC.) = 0.91
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.60
STREET FLOW TRAVEL TIME (MIN.) = 23.13 Tc (MIN.) = 52.78
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.554

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.23	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.92	0.69	0.600	61
COMMERCIAL	B	7.46	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.194

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 15.61 SUBAREA RUNOFF (CFS) = 6.28
EFFECTIVE AREA (ACRES) = 36.60 AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 36.6 PEAK FLOW RATE (CFS) = 11.49

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.65 HALFSTREET FLOOD WIDTH (FEET) = 20.00
FLOW VELOCITY (FEET/SEC.) = 0.90 DEPTH*VELOCITY (FT*FT/SEC.) = 0.59
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 2989.00 FEET.

FLOW PROCESS FROM NODE 4.00 TO NODE 9.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 362.50 DOWNSTREAM ELEVATION (FEET) = 362.00
STREET LENGTH (FEET) = 525.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.08
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.58
HALFSTREET FLOOD WIDTH (FEET) = 20.00
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.20
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.70
STREET FLOW TRAVEL TIME (MIN.) = 7.31 Tc (MIN.) = 60.09
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.510

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.08	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.99	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.493

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 5.07 SUBAREA RUNOFF (CFS) = 1.18

EFFECTIVE AREA (ACRES) = 41.67 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.39

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 41.7 PEAK FLOW RATE (CFS) = 11.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.58 HALFSTREET FLOOD WIDTH (FEET) = 20.00
FLOW VELOCITY (FEET/SEC.) = 1.18 DEPTH*VELOCITY (FT*FT/SEC.) = 0.68
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 9.00 = 3514.00 FEET.

FLOW PROCESS FROM NODE 9.00 TO NODE 9.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

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*****
FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 367.50  DOWNSTREAM (FEET) = 364.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.397
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.235
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS  Tc
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL            B      1.28      0.69      0.100      61  15.40
RESIDENTIAL
"3-5 DWELLINGS/ACRE"  B      4.84      0.69      0.600      61  20.87
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.495
SUBAREA RUNOFF (CFS) = 4.93
TOTAL AREA (ACRES) = 6.12  PEAK FLOW RATE (CFS) = 4.93

*****
FLOW PROCESS FROM NODE      6.00 TO NODE      8.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 364.50  DOWNSTREAM ELEVATION (FEET) = 362.50
STREET LENGTH (FEET) = 791.00  CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.44
HALFSTREET FLOOD WIDTH (FEET) = 15.35
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.37
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.60
STREET FLOW TRAVEL TIME (MIN.) = 9.63  Tc (MIN.) = 25.03
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.900
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL            B      1.34      0.69      0.100      61
RESIDENTIAL
"3-4 DWELLINGS/ACRE"  B      3.86      0.69      0.600      61

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.471
SUBAREA AREA (ACRES) = 5.20  SUBAREA RUNOFF (CFS) = 2.70
EFFECTIVE AREA (ACRES) = 11.32  AREA-AVERAGED Fm (INCH/HR) = 0.33
AREA-AVERAGED Fp (INCH/HR) = 0.69  AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 11.3  PEAK FLOW RATE (CFS) = 5.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.43  HALFSTREET FLOOD WIDTH (FEET) = 14.80
FLOW VELOCITY (FEET/SEC.) = 1.35  DEPTH*VELOCITY (FT*FT/SEC.) = 0.57
LONGEST FLOWPATH FROM NODE 5.00 TO NODE 8.00 = 1791.00 FEET.

*****
FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 25.03
RAINFALL INTENSITY (INCH/HR) = 0.90
AREA-AVERAGED Fm (INCH/HR) = 0.33
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.48
EFFECTIVE STREAM AREA (ACRES) = 11.32
TOTAL STREAM AREA (ACRES) = 11.32
PEAK FLOW RATE (CFS) AT CONFLUENCE = 5.79

*****
FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 653.00
ELEVATION DATA: UPSTREAM (FEET) = 364.00  DOWNSTREAM (FEET) = 362.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 13.696
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.332
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS  Tc
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL            B      1.12      0.69      0.100      61  13.70
RESIDENTIAL
"3-5 DWELLINGS/ACRE"  B      3.87      0.69      0.600      61  18.56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA RUNOFF (CFS) = 4.48
TOTAL AREA (ACRES) = 4.99  PEAK FLOW RATE (CFS) = 4.48

*****
FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2

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CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 13.70
RAINFALL INTENSITY(INCH/HR) = 1.33
AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.49
EFFECTIVE STREAM AREA(ACRES) = 4.99
TOTAL STREAM AREA(ACRES) = 4.99
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.48

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 2 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 8.33 Tc(MIN.) = 25.03
EFFECTIVE AREA(ACRES) = 16.31 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 16.3
LONGEST FLOWPATH FROM NODE 5.00 TO NODE 8.00 = 1791.00 FEET.

FLOW PROCESS FROM NODE 8.00 TO NODE 9.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 362.50 DOWNSTREAM(FEET) = 362.00
FLOW LENGTH(FEET) = 495.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.65
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.33
PIPE TRAVEL TIME(MIN.) = 3.11 Tc(MIN.) = 28.14
LONGEST FLOWPATH FROM NODE 5.00 TO NODE 9.00 = 2286.00 FEET.

FLOW PROCESS FROM NODE 9.00 TO NODE 9.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 28.14
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.834
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.24 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 3.42 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.467
SUBAREA AREA(ACRES) = 4.66 SUBAREA RUNOFF(CFS) = 2.16
EFFECTIVE AREA(ACRES) = 20.97 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 21.0 PEAK FLOW RATE(CFS) = 9.52

FLOW PROCESS FROM NODE 9.00 TO NODE 9.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 1 row of data.

** MEMORY BANK # 1 CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 1 row of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 15.13 Tc(MIN.) = 60.088
EFFECTIVE AREA(ACRES) = 62.64 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 62.6
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 9.00 = 3514.00 FEET.

FLOW PROCESS FROM NODE 9.00 TO NODE 9.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 9.00 TO NODE 10.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 362.00 DOWNSTREAM(FEET) = 361.50
FLOW LENGTH(FEET) = 617.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.85
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.13
PIPE TRAVEL TIME(MIN.) = 3.60 Tc(MIN.) = 63.69
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 10.00 = 4131.00 FEET.

FLOW PROCESS FROM NODE 10.00 TO NODE 10.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 63.69
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.491
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.77 0.69 0.100 61
RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 5.59 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.480
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA (ACRES) = 7.36 SUBAREA RUNOFF (CFS) = 1.69
 EFFECTIVE AREA (ACRES) = 70.00 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA (ACRES) = 70.0 PEAK FLOW RATE (CFS) = 17.80

 FLOW PROCESS FROM NODE 10.00 TO NODE 10.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

 MAINLINE Tc (MIN.) = 63.69
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.491
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 1.91 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 4.14 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.442
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA (ACRES) = 6.05 SUBAREA RUNOFF (CFS) = 1.49
 EFFECTIVE AREA (ACRES) = 76.05 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA (ACRES) = 76.1 PEAK FLOW RATE (CFS) = 19.29

 FLOW PROCESS FROM NODE 10.00 TO NODE 11.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM (FEET) = 361.50 DOWNSTREAM (FEET) = 352.00
 FLOW LENGTH (FEET) = 125.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.83
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 19.29
 PIPE TRAVEL TIME (MIN.) = 0.12 Tc (MIN.) = 63.81
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 11.00 = 4256.00 FEET.

+-----+
 | END OF SYSTEM "A" |
 | |
 | |
 +-----+

FLOW PROCESS FROM NODE 15.00 TO NODE 16.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 366.00 DOWNSTREAM (FEET) = 362.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.537
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282

SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 2.33 0.69 0.100 61 14.54
 RESIDENTIAL

"3-5 DWELLINGS/ACRE" B 6.61 0.69 0.600 61 19.70
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.470
 SUBAREA RUNOFF (CFS) = 7.72
 TOTAL AREA (ACRES) = 8.94 PEAK FLOW RATE (CFS) = 7.72

 FLOW PROCESS FROM NODE 16.00 TO NODE 17.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

 UPSTREAM ELEVATION (FEET) = 362.00 DOWNSTREAM ELEVATION (FEET) = 360.00
 STREET LENGTH (FEET) = 674.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.09
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.48
 HALFSTREET FLOOD WIDTH (FEET) = 18.01
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.63
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.79
 STREET FLOW TRAVEL TIME (MIN.) = 6.88 Tc (MIN.) = 21.42
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.996

SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 2.00 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 5.77 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.471
 SUBAREA AREA (ACRES) = 7.77 SUBAREA RUNOFF (CFS) = 4.71

EFFECTIVE AREA(ACRES) = 16.71 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 10.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 18.01
FLOW VELOCITY(FEET/SEC.) = 1.64 DEPTH*VELOCITY(FT*FT/SEC.) = 0.79
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 17.00 = 1674.00 FEET.

FLOW PROCESS FROM NODE 17.00 TO NODE 18.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 360.00 DOWNSTREAM ELEVATION(FEET) = 359.50
STREET LENGTH(FEET) = 305.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.48

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.43
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.79
STREET FLOW TRAVEL TIME(MIN.) = 3.56 Tc(MIN.) = 24.97
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.902

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.15	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	6.97	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.482

SUBAREA AREA(ACRES) = 9.12 SUBAREA RUNOFF(CFS) = 4.69
EFFECTIVE AREA(ACRES) = 25.83 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 13.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.47 DEPTH*VELOCITY(FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 18.00 = 1979.00 FEET.

FLOW PROCESS FROM NODE 18.00 TO NODE 19.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 359.50 DOWNSTREAM ELEVATION(FEET) = 359.00
STREET LENGTH(FEET) = 306.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.44

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.58
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.55
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.90
STREET FLOW TRAVEL TIME(MIN.) = 3.29 Tc(MIN.) = 28.26
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.832

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.15	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	0.19	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	6.80	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.482
SUBAREA AREA(ACRES) = 9.14 SUBAREA RUNOFF(CFS) = 4.10
EFFECTIVE AREA(ACRES) = 34.97 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 35.0 PEAK FLOW RATE(CFS) = 15.87

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.57 DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 19.00 = 2285.00 FEET.

FLOW PROCESS FROM NODE 19.00 TO NODE 22.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 359.00 DOWNSTREAM(FEET) = 358.50
FLOW LENGTH(FEET) = 164.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.65
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.87
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 28.85

LONGEST FLOWPATH FROM NODE 15.00 TO NODE 22.00 = 2449.00 FEET.

FLOW PROCESS FROM NODE 22.00 TO NODE 22.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 28.85

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.821

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.22	0.93	0.100	39
COMMERCIAL	B	1.24	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	0.69	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.95	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.73

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.457

SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 2.23

EFFECTIVE AREA(ACRES) = 40.07 AREA-AVERAGED Fm(INCH/HR) = 0.33

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47

TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 17.76

FLOW PROCESS FROM NODE 22.00 TO NODE 22.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 28.85

RAINFALL INTENSITY(INCH/HR) = 0.82

AREA-AVERAGED Fm(INCH/HR) = 0.33

AREA-AVERAGED Fp(INCH/HR) = 0.69

AREA-AVERAGED Ap = 0.47

EFFECTIVE STREAM AREA(ACRES) = 40.07

TOTAL STREAM AREA(ACRES) = 40.07

PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.76

FLOW PROCESS FROM NODE 20.00 TO NODE 21.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00

ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 359.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 25.995

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.878

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	9.94	0.69	0.600	61	26.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 4.18

TOTAL AREA(ACRES) = 9.94 PEAK FLOW RATE(CFS) = 4.18

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 358.50

STREET LENGTH(FEET) = 1243.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.75

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54

HALFSTREET FLOOD WIDTH(FEET) = 20.00

AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.69

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.37

STREET FLOW TRAVEL TIME(MIN.) = 30.22 Tc(MIN.) = 56.21

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.532

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	15.85	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 15.85 SUBAREA RUNOFF(CFS) = 3.04

EFFECTIVE AREA(ACRES) = 25.79 AREA-AVERAGED Fm(INCH/HR) = 0.41

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.60

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 4.94

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 0.65 DEPTH*VELOCITY(FT*FT/SEC.) = 0.34

LONGEST FLOWPATH FROM NODE 20.00 TO NODE 22.00 = 2243.00 FEET.

FLOW PROCESS FROM NODE 22.00 TO NODE 22.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 56.21
RAINFALL INTENSITY(INCH/HR) = 0.53
AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.60
EFFECTIVE STREAM AREA(ACRES) = 25.79
TOTAL STREAM AREA(ACRES) = 25.79
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.94

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 21.49 Tc(MIN.) = 28.85
EFFECTIVE AREA(ACRES) = 45.81 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 65.9
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 22.00 = 2449.00 FEET.

FLOW PROCESS FROM NODE 22.00 TO NODE 25.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 358.50 DOWNSTREAM(FEET) = 356.50
FLOW LENGTH(FEET) = 444.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.94
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 21.49
PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 30.09
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 25.00 = 2893.00 FEET.

FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.09
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.799

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows for Commercial, Residential, and School.

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.483
SUBAREA AREA(ACRES) = 5.01 SUBAREA RUNOFF(CFS) = 2.07
EFFECTIVE AREA(ACRES) = 50.82 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 21.49
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 30.09
RAINFALL INTENSITY(INCH/HR) = 0.80
AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.49
EFFECTIVE STREAM AREA(ACRES) = 50.82
TOTAL STREAM AREA(ACRES) = 70.87
PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.49

FLOW PROCESS FROM NODE 23.00 TO NODE 24.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 361.00 DOWNSTREAM(FEET) = 359.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.698
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.171
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.15 0.93 0.100 39 16.70
COMMERCIAL B 1.12 0.69 0.100 61 16.70
RESIDENTIAL
"3-5 DWELLINGS/ACRE" A 0.20 0.93 0.600 39 22.63
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 3.10 0.69 0.600 61 22.63
SCHOOL B 0.01 0.69 0.600 61 22.63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.70
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.461
SUBAREA RUNOFF(CFS) = 3.49
TOTAL AREA(ACRES) = 4.58 PEAK FLOW RATE(CFS) = 3.49

FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 356.50
STREET LENGTH(FEET) = 676.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.40

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.40

HALFSTREET FLOOD WIDTH(FEET) = 13.24

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.53

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.61

STREET FLOW TRAVEL TIME(MIN.) = 7.35 Tc(MIN.) = 24.05

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.924

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.69	0.93	0.100	39
COMMERCIAL	B	1.12	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	1.76	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.90	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.76

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.479

SUBAREA AREA(ACRES) = 7.47 SUBAREA RUNOFF(CFS) = 3.76

EFFECTIVE AREA(ACRES) = 12.05 AREA-AVERAGED Fm(INCH/HR) = 0.35

AREA-AVERAGED Fp(INCH/HR) = 0.74 AREA-AVERAGED Ap = 0.47

TOTAL AREA(ACRES) = 12.1 PEAK FLOW RATE(CFS) = 6.23

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 14.10

FLOW VELOCITY(FEET/SEC.) = 1.58 DEPTH*VELOCITY(FT*FT/SEC.) = 0.66

LONGEST FLOWPATH FROM NODE 23.00 TO NODE 25.00 = 1676.00 FEET.

FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 24.05

RAINFALL INTENSITY(INCH/HR) = 0.92

AREA-AVERAGED Fm(INCH/HR) = 0.35

AREA-AVERAGED Fp(INCH/HR) = 0.74

AREA-AVERAGED Ap = 0.47

EFFECTIVE STREAM AREA(ACRES) = 12.05

TOTAL STREAM AREA(ACRES) = 12.05

PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.23

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	21.49	30.09	0.799	0.69(0.34)	0.49	50.8	15.00
2	6.23	24.05	0.924	0.74(0.35)	0.47	12.1	23.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 26.37 Tc(MIN.) = 30.09

EFFECTIVE AREA(ACRES) = 62.87 AREA-AVERAGED Fm(INCH/HR) = 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.70 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 82.9

LONGEST FLOWPATH FROM NODE 15.00 TO NODE 25.00 = 2893.00 FEET.

FLOW PROCESS FROM NODE 25.00 TO NODE 26.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.50 DOWNSTREAM(FEET) = 347.40

FLOW LENGTH(FEET) = 44.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 26.61

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 26.37

PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 30.12

LONGEST FLOWPATH FROM NODE 15.00 TO NODE 26.00 = 2937.00 FEET.

+-----+
| END OF SYSTEM "B" |
| |
| |
+-----+

FLOW PROCESS FROM NODE 30.00 TO NODE 31.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00

ELEVATION DATA: UPSTREAM(FEET) = 364.00 DOWNSTREAM(FEET) = 360.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.537

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.282

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	2.25	0.69	0.100	61	14.54
COMMERCIAL	B	6.52	0.69	0.100	61	14.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 9.57

TOTAL AREA(ACRES) = 8.77 PEAK FLOW RATE(CFS) = 9.57

FLOW PROCESS FROM NODE 31.00 TO NODE 32.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 360.00 DOWNSTREAM ELEVATION(FEET) = 359.50
STREET LENGTH(FEET) = 701.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.45

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.63

HALFSTREET FLOOD WIDTH(FEET) = 20.00

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.14

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.72

STREET FLOW TRAVEL TIME(MIN.) = 10.21 Tc(MIN.) = 24.75

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.907

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.47	0.69	0.100	61
COMMERCIAL	B	9.67	0.69	0.100	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 10.14 SUBAREA RUNOFF(CFS) = 7.65

EFFECTIVE AREA(ACRES) = 18.91 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 18.9 PEAK FLOW RATE(CFS) = 14.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 1.17 DEPTH*VELOCITY(FT*FT/SEC.) = 0.74

LONGEST FLOWPATH FROM NODE 30.00 TO NODE 32.00 = 1701.00 FEET.

FLOW PROCESS FROM NODE 32.00 TO NODE 33.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 359.50 DOWNSTREAM(FEET) = 356.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 411.00 CHANNEL SLOPE = 0.0085

CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 2.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.864

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.01	0.69	0.100	61

COMMERCIAL B 9.10 0.69 0.100 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.58

AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 1.91

Tc(MIN.) = 26.66

SUBAREA AREA(ACRES) = 10.11 SUBAREA RUNOFF(CFS) = 7.24

EFFECTIVE AREA(ACRES) = 29.02 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 29.0 PEAK FLOW RATE(CFS) = 20.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 3.74

LONGEST FLOWPATH FROM NODE 30.00 TO NODE 33.00 = 2112.00 FEET.

| END OF SYSTEM "C1" |
| |

FLOW PROCESS FROM NODE 34.00 TO NODE 35.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00

ELEVATION DATA: UPSTREAM(FEET) = 361.00 DOWNSTREAM(FEET) = 359.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.687

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.128

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	2.13	0.69	0.100	61	17.69
COMMERCIAL	B	4.45	0.69	0.100	61	17.69

RESIDENTIAL

"3-5 DWELLINGS/ACRE" B 2.79 0.69 0.600 61 23.97

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.249

SUBAREA RUNOFF(CFS) = 8.07

TOTAL AREA(ACRES) = 9.37 PEAK FLOW RATE(CFS) = 8.07

FLOW PROCESS FROM NODE 35.00 TO NODE 38.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 359.50 DOWNSTREAM ELEVATION(FEET) = 350.00

STREET LENGTH(FEET) = 505.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.33
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 12.85
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.40
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.33
STREET FLOW TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 20.17
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.27 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 11.13 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.588
SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 6.49
EFFECTIVE AREA(ACRES) = 20.77 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 13.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.95
FLOW VELOCITY(FEET/SEC.) = 3.57 DEPTH*VELOCITY(FT*FT/SEC.) = 1.47
LONGEST FLOWPATH FROM NODE 34.00 TO NODE 38.00 = 1505.00 FEET.

FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.17
RAINFALL INTENSITY(INCH/HR) = 1.04
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 20.77
TOTAL STREAM AREA(ACRES) = 20.77
PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.79

FLOW PROCESS FROM NODE 36.00 TO NODE 37.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 357.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.397
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.235
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 1.66 0.69 0.100 61 15.40
COMMERCIAL B 0.23 0.69 0.100 61 15.40
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 5.93 0.69 0.600 61 20.87
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.479
SUBAREA RUNOFF(CFS) = 6.38
TOTAL AREA(ACRES) = 7.82 PEAK FLOW RATE(CFS) = 6.38

FLOW PROCESS FROM NODE 37.00 TO NODE 38.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 357.00 DOWNSTREAM ELEVATION(FEET) = 350.00
STREET LENGTH(FEET) = 506.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.92
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.40
HALFSTREET FLOOD WIDTH(FEET) = 13.48
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.01
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.21
STREET FLOW TRAVEL TIME(MIN.) = 2.80 Tc(MIN.) = 18.20
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.107

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.35 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 13.96 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.588
SUBAREA AREA(ACRES) = 14.31 SUBAREA RUNOFF(CFS) = 9.07
EFFECTIVE AREA(ACRES) = 22.13 AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 14.55

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.27
FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH*VELOCITY(FT*FT/SEC.) = 1.39

LONGEST FLOWPATH FROM NODE 36.00 TO NODE 38.00 = 1506.00 FEET.

FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.20
RAINFALL INTENSITY(INCH/HR) = 1.11
AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA(ACRES) = 22.13
TOTAL STREAM AREA(ACRES) = 22.13
PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.55

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 2 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 27.67 Tc(MIN.) = 18.20
EFFECTIVE AREA(ACRES) = 40.14 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 42.9
LONGEST FLOWPATH FROM NODE 36.00 TO NODE 38.00 = 1506.00 FEET.

+-----+
| END OF SYSTEM "C2" |
| |
| |
+-----+

FLOW PROCESS FROM NODE 40.00 TO NODE 41.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 361.00 DOWNSTREAM(FEET) = 359.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.698
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.171
SUBAREA Tc AND LOSS RATE DATA(AMC II):

Table with 8 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Contains 3 rows of data.

SUBAREA RUNOFF(CFS) = 7.12
TOTAL AREA(ACRES) = 10.08 PEAK FLOW RATE(CFS) = 7.12

FLOW PROCESS FROM NODE 41.00 TO NODE 42.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 355.00
STREET LENGTH(FEET) = 992.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.72
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 16.68
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.81
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.84
STREET FLOW TRAVEL TIME(MIN.) = 9.11 Tc(MIN.) = 25.81
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.883

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Contains 3 rows of data.

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.60
FLOW VELOCITY(FEET/SEC.) = 1.82 DEPTH*VELOCITY(FT*FT/SEC.) = 0.84
LONGEST FLOWPATH FROM NODE 40.00 TO NODE 42.00 = 1992.00 FEET.

FLOW PROCESS FROM NODE 42.00 TO NODE 47.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 352.00
STREET LENGTH(FEET) = 1120.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.39
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.49
 HALFSTREET FLOOD WIDTH(FEET) = 18.55
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.59
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.78
 STREET FLOW TRAVEL TIME(MIN.) = 11.75 Tc(MIN.) = 37.56
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.692
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.39	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.61	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.426
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 1.44
 EFFECTIVE AREA(ACRES) = 24.07 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
 TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 9.67
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.09
 FLOW VELOCITY(FEET/SEC.) = 1.55 DEPTH*VELOCITY(FT*FT/SEC.) = 0.75
 LONGEST FLOWPATH FROM NODE 40.00 TO NODE 47.00 = 3112.00 FEET.

 FLOW PROCESS FROM NODE 47.00 TO NODE 47.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 37.56
 RAINFALL INTENSITY(INCH/HR) = 0.69
 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.49
 EFFECTIVE STREAM AREA(ACRES) = 24.07
 TOTAL STREAM AREA(ACRES) = 24.07
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.67

 FLOW PROCESS FROM NODE 43.00 TO NODE 44.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 357.00 DOWNSTREAM(FEET) = 354.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.969
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.206
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	2.75	0.69	0.100	61	15.97
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	5.18	0.69	0.600	61	21.64

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.427
 SUBAREA RUNOFF(CFS) = 6.52
 TOTAL AREA(ACRES) = 7.93 PEAK FLOW RATE(CFS) = 6.52

 FLOW PROCESS FROM NODE 44.00 TO NODE 45.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

 UPSTREAM ELEVATION(FEET) = 354.50 DOWNSTREAM ELEVATION(FEET) = 353.50
 STREET LENGTH(FEET) = 374.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.39
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.47
 HALFSTREET FLOOD WIDTH(FEET) = 17.07
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.50
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.70
 STREET FLOW TRAVEL TIME(MIN.) = 4.15 Tc(MIN.) = 20.12
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.037
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.49	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	4.33	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.472
 SUBAREA AREA(ACRES) = 5.82 SUBAREA RUNOFF(CFS) = 3.74
 EFFECTIVE AREA(ACRES) = 13.75 AREA-AVERAGED Fm(INCH/HR) = 0.31
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 9.05

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.62
FLOW VELOCITY (FEET/SEC.) = 1.53 DEPTH*VELOCITY (FT*FT/SEC.) = 0.73
LONGEST FLOWPATH FROM NODE 43.00 TO NODE 45.00 = 1374.00 FEET.

FLOW PROCESS FROM NODE 45.00 TO NODE 46.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 353.50 DOWNSTREAM (FEET) = 353.00
FLOW LENGTH (FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.29
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 9.05
PIPE TRAVEL TIME (MIN.) = 1.42 Tc (MIN.) = 21.54
LONGEST FLOWPATH FROM NODE 43.00 TO NODE 46.00 = 1654.00 FEET.

FLOW PROCESS FROM NODE 46.00 TO NODE 46.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.54
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.993
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.15 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" A 0.07 0.93 0.600 39
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 3.24 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.471
SUBAREA AREA (ACRES) = 4.46 SUBAREA RUNOFF (CFS) = 2.68
EFFECTIVE AREA (ACRES) = 18.21 AREA-AVERAGED Fm (INCH/HR) = 0.31
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
TOTAL AREA (ACRES) = 18.2 PEAK FLOW RATE (CFS) = 11.18

FLOW PROCESS FROM NODE 46.00 TO NODE 47.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 352.00
FLOW LENGTH (FEET) = 488.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.75
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 11.18
PIPE TRAVEL TIME (MIN.) = 2.17 Tc (MIN.) = 23.71
LONGEST FLOWPATH FROM NODE 43.00 TO NODE 47.00 = 2142.00 FEET.

FLOW PROCESS FROM NODE 47.00 TO NODE 47.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 23.71
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.932
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.01 0.93 0.100 39
COMMERCIAL B 0.92 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" A 0.79 0.93 0.600 39
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 1.77 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.76
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.467
SUBAREA AREA (ACRES) = 3.49 SUBAREA RUNOFF (CFS) = 1.82
EFFECTIVE AREA (ACRES) = 21.70 AREA-AVERAGED Fm (INCH/HR) = 0.32
AREA-AVERAGED Fp (INCH/HR) = 0.70 AREA-AVERAGED Ap = 0.45
TOTAL AREA (ACRES) = 21.7 PEAK FLOW RATE (CFS) = 12.01

FLOW PROCESS FROM NODE 47.00 TO NODE 47.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 23.71
RAINFALL INTENSITY (INCH/HR) = 0.93
AREA-AVERAGED Fm (INCH/HR) = 0.32
AREA-AVERAGED Fp (INCH/HR) = 0.70
AREA-AVERAGED Ap = 0.45
EFFECTIVE STREAM AREA (ACRES) = 21.70
TOTAL STREAM AREA (ACRES) = 21.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 12.01

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 9.67 37.56 0.692 0.69 (0.34) 0.49 24.1 40.00
2 12.01 23.71 0.932 0.70 (0.32) 0.45 21.7 43.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 19.90 Tc (MIN.) = 23.71
EFFECTIVE AREA (ACRES) = 33.37 AREA-AVERAGED Fm (INCH/HR) = 0.32
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
TOTAL AREA (ACRES) = 45.8
LONGEST FLOWPATH FROM NODE 40.00 TO NODE 47.00 = 3112.00 FEET.

FLOW PROCESS FROM NODE 47.00 TO NODE 50.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 352.00 DOWNSTREAM (FEET) = 349.50

FLOW LENGTH(FEET) = 915.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.72
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 19.90
 PIPE TRAVEL TIME(MIN.) = 3.23 Tc(MIN.) = 26.94
 LONGEST FLOWPATH FROM NODE 40.00 TO NODE 50.00 = 4027.00 FEET.

 FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 26.94
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.858
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.62	0.93	0.100	39
COMMERCIAL	B	2.42	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	2.12	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	5.56	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.458
 SUBAREA AREA(ACRES) = 10.72 SUBAREA RUNOFF(CFS) = 4.96
 EFFECTIVE AREA(ACRES) = 44.09 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.47
 TOTAL AREA(ACRES) = 56.5 PEAK FLOW RATE(CFS) = 20.98

 FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 26.94
 RAINFALL INTENSITY(INCH/HR) = 0.86
 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.71
 AREA-AVERAGED Ap = 0.47
 EFFECTIVE STREAM AREA(ACRES) = 44.09
 TOTAL STREAM AREA(ACRES) = 56.49
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 20.98

 FLOW PROCESS FROM NODE 48.00 TO NODE 49.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 868.00
 ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 353.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.338

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.238
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.04	0.69	0.100	61	15.34
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	2.40	0.69	0.600	61	20.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.449
 SUBAREA RUNOFF(CFS) = 2.88
 TOTAL AREA(ACRES) = 3.44 PEAK FLOW RATE(CFS) = 2.88

 FLOW PROCESS FROM NODE 49.00 TO NODE 50.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 349.50
 FLOW LENGTH(FEET) = 1156.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.14
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2.88
 PIPE TRAVEL TIME(MIN.) = 6.14 Tc(MIN.) = 21.48
 LONGEST FLOWPATH FROM NODE 48.00 TO NODE 50.00 = 2024.00 FEET.

 FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.48
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.994
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.07	0.93	0.100	39
COMMERCIAL	B	1.64	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	0.06	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	4.19	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.457
 SUBAREA AREA(ACRES) = 5.96 SUBAREA RUNOFF(CFS) = 3.64
 EFFECTIVE AREA(ACRES) = 9.40 AREA-AVERAGED Fm(INCH/HR) = 0.31
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 9.4 PEAK FLOW RATE(CFS) = 5.77

 FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.48
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.994

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.56	0.93	0.100	39
COMMERCIAL	B	0.99	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	1.07	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.37	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.76
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.445
SUBAREA AREA(ACRES) = 4.99 SUBAREA RUNOFF(CFS) = 2.94
EFFECTIVE AREA(ACRES) = 14.39 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 14.4 PEAK FLOW RATE(CFS) = 8.71

FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 21.48
RAINFALL INTENSITY(INCH/HR) = 0.99
AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.71
AREA-AVERAGED Ap = 0.45
EFFECTIVE STREAM AREA(ACRES) = 14.39
TOTAL STREAM AREA(ACRES) = 14.39
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.71

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	20.98	26.94	0.858	0.71(0.33)	0.47	44.1	43.00
2	8.71	21.48	0.994	0.71(0.32)	0.45	14.4	48.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 27.93 Tc(MIN.) = 26.94
EFFECTIVE AREA(ACRES) = 58.48 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 70.9
LONGEST FLOWPATH FROM NODE 40.00 TO NODE 50.00 = 4027.00 FEET.

FLOW PROCESS FROM NODE 50.00 TO NODE 51.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 349.50 DOWNSTREAM(FEET) = 344.00
FLOW LENGTH(FEET) = 598.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.08
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.93

PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 28.17
LONGEST FLOWPATH FROM NODE 40.00 TO NODE 51.00 = 4625.00 FEET.

+-----+
| END OF SYSTEM "D1" |
| |
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+-----+

FLOW PROCESS FROM NODE 52.00 TO NODE 53.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 355.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.902
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.319
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.64	0.69	0.100	61	13.90
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	2.35	0.69	0.600	61	18.84
SCHOOL	B	2.70	0.69	0.600	61	18.84

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544
SUBAREA RUNOFF(CFS) = 4.85
TOTAL AREA(ACRES) = 5.69 PEAK FLOW RATE(CFS) = 4.85

FLOW PROCESS FROM NODE 53.00 TO NODE 54.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 352.00
STREET LENGTH(FEET) = 920.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.78
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 14.96
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.55
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.66

STREET FLOW TRAVEL TIME(MIN.) = 9.92 Tc(MIN.) = 23.83
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.930
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 0.59 0.69 0.100 61
 SCHOOL B 7.16 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.562
 SUBAREA AREA(ACRES) = 7.75 SUBAREA RUNOFF(CFS) = 3.80
 EFFECTIVE AREA(ACRES) = 13.44 AREA-AVERAGED Fm(INCH/HR) = 0.38
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.55
 TOTAL AREA(ACRES) = 13.4 PEAK FLOW RATE(CFS) = 6.65

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 14.88
 FLOW VELOCITY(FEET/SEC.) = 1.53 DEPTH*VELOCITY(FT*FT/SEC.) = 0.66
 LONGEST FLOWPATH FROM NODE 52.00 TO NODE 54.00 = 1920.00 FEET.

 FLOW PROCESS FROM NODE 54.00 TO NODE 55.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 352.00 DOWNSTREAM(FEET) = 351.00
 FLOW LENGTH(FEET) = 831.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 2.68
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.65
 PIPE TRAVEL TIME(MIN.) = 5.17 Tc(MIN.) = 28.99
 LONGEST FLOWPATH FROM NODE 52.00 TO NODE 55.00 = 2751.00 FEET.

 FLOW PROCESS FROM NODE 55.00 TO NODE 55.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 28.99
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.818
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 0.48 0.69 0.100 61
 SCHOOL B 9.72 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.576
 SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 3.88
 EFFECTIVE AREA(ACRES) = 23.64 AREA-AVERAGED Fm(INCH/HR) = 0.39
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.56
 TOTAL AREA(ACRES) = 23.6 PEAK FLOW RATE(CFS) = 9.18

 FLOW PROCESS FROM NODE 55.00 TO NODE 58.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 351.00 DOWNSTREAM(FEET) = 350.00
 FLOW LENGTH(FEET) = 203.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.94
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.18
 PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 29.68
 LONGEST FLOWPATH FROM NODE 52.00 TO NODE 58.00 = 2954.00 FEET.

 FLOW PROCESS FROM NODE 58.00 TO NODE 58.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 29.68
 RAINFALL INTENSITY(INCH/HR) = 0.81
 AREA-AVERAGED Fm(INCH/HR) = 0.39
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.56
 EFFECTIVE STREAM AREA(ACRES) = 23.64
 TOTAL STREAM AREA(ACRES) = 23.64
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.18

 FLOW PROCESS FROM NODE 56.00 TO NODE 57.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 357.50 DOWNSTREAM(FEET) = 354.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.234
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.034
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" A 0.01 0.93 0.600 39 20.23
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" B 0.02 0.69 0.600 61 20.23
 SCHOOL A 2.66 0.93 0.600 39 20.23
 SCHOOL B 7.01 0.69 0.600 61 20.23
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA RUNOFF(CFS) = 5.08
 TOTAL AREA(ACRES) = 9.70 PEAK FLOW RATE(CFS) = 5.08

 FLOW PROCESS FROM NODE 57.00 TO NODE 58.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 354.00 DOWNSTREAM(FEET) = 350.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 489.00 CHANNEL SLOPE = 0.0082
 CHANNEL BASE(FEET) = 100.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.798
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.36	0.69	0.100	61
SCHOOL	A	0.85	0.93	0.600	39
SCHOOL	B	7.94	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.71
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.580
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.70
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 0.83
 AVERAGE FLOW DEPTH(FEET) = 0.08 TRAVEL TIME(MIN.) = 9.87
 Tc(MIN.) = 30.10
 SUBAREA AREA(ACRES) = 9.15 SUBAREA RUNOFF(CFS) = 3.19
 EFFECTIVE AREA(ACRES) = 18.85 AREA-AVERAGED Fm(INCH/HR) = 0.43
 AREA-AVERAGED Fp(INCH/HR) = 0.73 AREA-AVERAGED Ap = 0.59
 TOTAL AREA(ACRES) = 18.9 PEAK FLOW RATE(CFS) = 6.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.08 FLOW VELOCITY(FEET/SEC.) = 0.78
 LONGEST FLOWPATH FROM NODE 56.00 TO NODE 58.00 = 1489.00 FEET.

 FLOW PROCESS FROM NODE 58.00 TO NODE 58.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 30.10
 RAINFALL INTENSITY(INCH/HR) = 0.80
 AREA-AVERAGED Fm(INCH/HR) = 0.43
 AREA-AVERAGED Fp(INCH/HR) = 0.73
 AREA-AVERAGED Ap = 0.59
 EFFECTIVE STREAM AREA(ACRES) = 18.85
 TOTAL STREAM AREA(ACRES) = 18.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.21

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.18	29.68	0.806	0.69(0.39)	0.56	23.6	52.00
2	6.21	30.10	0.798	0.73(0.43)	0.59	18.9	56.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 15.35 Tc(MIN.) = 29.68
 EFFECTIVE AREA(ACRES) = 41.98 AREA-AVERAGED Fm(INCH/HR) = 0.41
 AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.58
 TOTAL AREA(ACRES) = 42.5
 LONGEST FLOWPATH FROM NODE 52.00 TO NODE 58.00 = 2954.00 FEET.

+-----+
 | END OF SYSTEM "D2" |

| |
 | |
 +-----+

 FLOW PROCESS FROM NODE 70.00 TO NODE 71.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 353.50 DOWNSTREAM(FEET) = 352.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 19.181
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.070
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	2.02	0.69	0.100	61	19.18
RESIDENTIAL "3-5 DWELLINGS/ACRE"	B	4.15	0.69	0.600	61	26.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.436
 SUBAREA RUNOFF(CFS) = 4.28
 TOTAL AREA(ACRES) = 6.17 PEAK FLOW RATE(CFS) = 4.28

 FLOW PROCESS FROM NODE 71.00 TO NODE 72.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 352.50 DOWNSTREAM ELEVATION(FEET) = 351.00
 STREET LENGTH(FEET) = 536.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.29
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.43
 HALFSTREET FLOOD WIDTH(FEET) = 14.96
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.43
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.62
 STREET FLOW TRAVEL TIME(MIN.) = 6.23 Tc(MIN.) = 25.41
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.891

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.20	0.69	0.100	61

RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 5.48 0.69 0.600 61
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.457
 SUBAREA AREA(ACRES) = 7.68 SUBAREA RUNOFF(CFS) = 4.00
 EFFECTIVE AREA(ACRES) = 13.85 AREA-AVERAGED Fm(INCH/HR) = 0.31
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 7.28

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 15.98
 FLOW VELOCITY(FEET/SEC.) = 1.47 DEPTH*VELOCITY(FT*FT/SEC.) = 0.66
 LONGEST FLOWPATH FROM NODE 70.00 TO NODE 72.00 = 1536.00 FEET.

 FLOW PROCESS FROM NODE 72.00 TO NODE 73.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 351.00 DOWNSTREAM ELEVATION(FEET) = 350.00
 STREET LENGTH(FEET) = 1029.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.18

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.08
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.59
 STREET FLOW TRAVEL TIME(MIN.) = 15.84 Tc(MIN.) = 41.26
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.651

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.70	0.69	0.100	61
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.40	0.69	0.400	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	4.16	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.373
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 10.26 SUBAREA RUNOFF(CFS) = 3.77
 EFFECTIVE AREA(ACRES) = 24.11 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 8.25

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.03 DEPTH*VELOCITY(FT*FT/SEC.) = 0.55
 LONGEST FLOWPATH FROM NODE 70.00 TO NODE 73.00 = 2565.00 FEET.

 FLOW PROCESS FROM NODE 73.00 TO NODE 81.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 350.00 DOWNSTREAM ELEVATION(FEET) = 346.00
 STREET LENGTH(FEET) = 1450.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.47

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.48
 HALFSTREET FLOOD WIDTH(FEET) = 17.77
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.57
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.75
 STREET FLOW TRAVEL TIME(MIN.) = 15.39 Tc(MIN.) = 56.64
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.529

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.09	0.93	0.100	39
COMMERCIAL	B	2.59	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	0.02	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	6.78	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.459
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 9.48 SUBAREA RUNOFF(CFS) = 2.45
 EFFECTIVE AREA(ACRES) = 33.59 AREA-AVERAGED Fm(INCH/HR) = 0.29
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 33.6 PEAK FLOW RATE(CFS) = 9.16

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.54
 FLOW VELOCITY(FEET/SEC.) = 1.56 DEPTH*VELOCITY(FT*FT/SEC.) = 0.74

LONGEST FLOWPATH FROM NODE 70.00 TO NODE 81.00 = 4015.00 FEET.

FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 74.00 TO NODE 75.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00

ELEVATION DATA: UPSTREAM (FEET) = 351.50 DOWNSTREAM (FEET) = 349.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.969

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.206

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	5.29	0.69	0.100	61	15.97
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	0.01	0.69	0.600	61	21.64

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.101

SUBAREA RUNOFF (CFS) = 5.42

TOTAL AREA (ACRES) = 5.30 PEAK FLOW RATE (CFS) = 5.42

FLOW PROCESS FROM NODE 75.00 TO NODE 76.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 349.00 DOWNSTREAM ELEVATION (FEET) = 348.50

STREET LENGTH (FEET) = 398.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.75

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.51

HALFSTREET FLOOD WIDTH (FEET) = 19.26

AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.11

PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.56

STREET FLOW TRAVEL TIME (MIN.) = 6.00 Tc (MIN.) = 21.97

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.980

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.52	0.69	0.100	61

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 3.86 0.69 0.400 61

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 0.21 0.69 0.600 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.292

SUBAREA AREA (ACRES) = 6.59 SUBAREA RUNOFF (CFS) = 4.63

EFFECTIVE AREA (ACRES) = 11.89 AREA-AVERAGED Fm (INCH/HR) = 0.14

AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.21

TOTAL AREA (ACRES) = 11.9 PEAK FLOW RATE (CFS) = 8.97

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 20.00

FLOW VELOCITY (FEET/SEC.) = 1.16 DEPTH*VELOCITY (FT*FT/SEC.) = 0.61

LONGEST FLOWPATH FROM NODE 74.00 TO NODE 76.00 = 1398.00 FEET.

FLOW PROCESS FROM NODE 76.00 TO NODE 80.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 348.50 DOWNSTREAM ELEVATION (FEET) = 345.50

STREET LENGTH (FEET) = 800.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.23

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.47

HALFSTREET FLOOD WIDTH (FEET) = 17.23

AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.80

PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.85

STREET FLOW TRAVEL TIME (MIN.) = 7.41 Tc (MIN.) = 29.38

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.811

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.59	0.69	0.100	61

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 4.03 0.69 0.600 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.459

SUBAREA AREA (ACRES) = 5.62 SUBAREA RUNOFF (CFS) = 2.51

EFFECTIVE AREA (ACRES) = 17.51 AREA-AVERAGED Fm (INCH/HR) = 0.20

AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.29

TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 9.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 16.84
FLOW VELOCITY (FEET/SEC.) = 1.78 DEPTH*VELOCITY (FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 74.00 TO NODE 80.00 = 2198.00 FEET.

FLOW PROCESS FROM NODE 80.00 TO NODE 80.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 29.38
RAINFALL INTENSITY (INCH/HR) = 0.81
AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.29
EFFECTIVE STREAM AREA (ACRES) = 17.51
TOTAL STREAM AREA (ACRES) = 17.51
PEAK FLOW RATE (CFS) AT CONFLUENCE = 9.68

FLOW PROCESS FROM NODE 77.00 TO NODE 78.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 347.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.397
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.235

SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.84 0.69 0.100 61 15.40
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 1.84 0.69 0.600 61 20.87
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443
SUBAREA RUNOFF (CFS) = 2.24
TOTAL AREA (ACRES) = 2.68 PEAK FLOW RATE (CFS) = 2.24

FLOW PROCESS FROM NODE 78.00 TO NODE 79.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 347.00 DOWNSTREAM ELEVATION (FEET) = 346.50
STREET LENGTH (FEET) = 204.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.25

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.39
HALFSTREET FLOOD WIDTH (FEET) = 13.01
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.25
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.49
STREET FLOW TRAVEL TIME (MIN.) = 2.73 Tc (MIN.) = 18.13
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.110

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.57 0.69 0.100 61
RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 4.02 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.460
SUBAREA AREA (ACRES) = 5.59 SUBAREA RUNOFF (CFS) = 4.00
EFFECTIVE AREA (ACRES) = 8.27 AREA-AVERAGED Fm (INCH/HR) = 0.31
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
TOTAL AREA (ACRES) = 8.3 PEAK FLOW RATE (CFS) = 5.94

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 15.04
FLOW VELOCITY (FEET/SEC.) = 1.34 DEPTH*VELOCITY (FT*FT/SEC.) = 0.58
LONGEST FLOWPATH FROM NODE 77.00 TO NODE 79.00 = 1204.00 FEET.

FLOW PROCESS FROM NODE 79.00 TO NODE 80.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 346.50 DOWNSTREAM ELEVATION (FEET) = 346.00
STREET LENGTH (FEET) = 494.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.52

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.52
HALFSTREET FLOOD WIDTH (FEET) = 19.88
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.01
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.52

STREET FLOW TRAVEL TIME(MIN.) = 8.16 Tc(MIN.) = 26.28
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.872
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 2.12 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.83 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.422
 SUBAREA AREA(ACRES) = 5.95 SUBAREA RUNOFF(CFS) = 3.12
 EFFECTIVE AREA(ACRES) = 14.22 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
 TOTAL AREA(ACRES) = 14.2 PEAK FLOW RATE(CFS) = 7.29

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.65
 FLOW VELOCITY(FEET/SEC.) = 1.00 DEPTH*VELOCITY(FT*FT/SEC.) = 0.51
 LONGEST FLOWPATH FROM NODE 77.00 TO NODE 80.00 = 1698.00 FEET.

 FLOW PROCESS FROM NODE 80.00 TO NODE 80.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 26.28
 RAINFALL INTENSITY(INCH/HR) = 0.87
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.44
 EFFECTIVE STREAM AREA(ACRES) = 14.22
 TOTAL STREAM AREA(ACRES) = 14.22
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.29

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.68	29.38	0.811	0.69(0.20)	0.29	17.5	74.00
2	7.29	26.28	0.872	0.69(0.30)	0.44	14.2	77.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 16.19 Tc(MIN.) = 29.38
 EFFECTIVE AREA(ACRES) = 31.73 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 31.7
 LONGEST FLOWPATH FROM NODE 74.00 TO NODE 80.00 = 2198.00 FEET.

 FLOW PROCESS FROM NODE 80.00 TO NODE 81.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

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UPSTREAM ELEVATION(FEET) = 346.00 DOWNSTREAM ELEVATION(FEET) = 345.50
 STREET LENGTH(FEET) = 629.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.13
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.66
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.30
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.86
 STREET FLOW TRAVEL TIME(MIN.) = 8.06 Tc(MIN.) = 37.44
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.693

SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 1.00 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 5.18 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519
 SUBAREA AREA(ACRES) = 6.18 SUBAREA RUNOFF(CFS) = 1.87
 EFFECTIVE AREA(ACRES) = 37.91 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.38
 TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 16.19
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.27 DEPTH*VELOCITY(FT*FT/SEC.) = 0.83
 LONGEST FLOWPATH FROM NODE 74.00 TO NODE 81.00 = 2827.00 FEET.

 FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
 =====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	16.19	37.44	0.693	0.69(0.26)	0.38	37.9	74.00

LONGEST FLOWPATH FROM NODE 74.00 TO NODE 81.00 = 2827.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.16	56.64	0.529	0.69(0.29)	0.43	33.6	70.00

LONGEST FLOWPATH FROM NODE 70.00 TO NODE 81.00 = 4015.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 23.79 Tc(MIN.) = 37.442
 EFFECTIVE AREA(ACRES) = 54.38 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 71.5
 LONGEST FLOWPATH FROM NODE 70.00 TO NODE 81.00 = 4015.00 FEET.

 FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

 FLOW PROCESS FROM NODE 81.00 TO NODE 87.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 345.50 DOWNSTREAM ELEVATION(FEET) = 345.00
 STREET LENGTH(FEET) = 532.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.86
 STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.72
 HALFSTREET FLOOD WIDTH(FEET) = 22.82
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.57
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.14

STREET FLOW TRAVEL TIME(MIN.) = 5.64 Tc(MIN.) = 43.08

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.633

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.31	0.93	0.100	39
COMMERCIAL	B	1.92	0.69	0.100	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	0.53	0.93	0.500	39
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.97	0.69	0.500	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.72

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.344

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 5.73 SUBAREA RUNOFF(CFS) = 2.14

EFFECTIVE AREA(ACRES) = 60.11 AREA-AVERAGED Fm(INCH/HR) = 0.27

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.39

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 77.2 PEAK FLOW RATE(CFS) = 23.79
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 22.27
 FLOW VELOCITY(FEET/SEC.) = 1.55 DEPTH*VELOCITY(FT*FT/SEC.) = 1.11
 LONGEST FLOWPATH FROM NODE 70.00 TO NODE 87.00 = 4547.00 FEET.

 FLOW PROCESS FROM NODE 87.00 TO NODE 87.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

 FLOW PROCESS FROM NODE 82.00 TO NODE 83.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 355.50 DOWNSTREAM(FEET) = 350.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.902
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.319
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.70	0.69	0.100	61	13.90
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	3.74	0.69	0.600	61	18.84

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.521
 SUBAREA RUNOFF(CFS) = 3.84
 TOTAL AREA(ACRES) = 4.44 PEAK FLOW RATE(CFS) = 3.84

 FLOW PROCESS FROM NODE 83.00 TO NODE 86.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 350.50 DOWNSTREAM ELEVATION(FEET) = 350.00
 STREET LENGTH(FEET) = 849.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.97
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.50
 HALFSTREET FLOOD WIDTH(FEET) = 18.71
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.75
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.37
 STREET FLOW TRAVEL TIME(MIN.) = 18.92 Tc(MIN.) = 32.82
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.59	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	0.15	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	5.57	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.553
 SUBAREA AREA(ACRES) = 6.31 SUBAREA RUNOFF(CFS) = 2.11
 EFFECTIVE AREA(ACRES) = 10.75 AREA-AVERAGED Fm(INCH/HR) = 0.37
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.54
 TOTAL AREA(ACRES) = 10.8 PEAK FLOW RATE(CFS) = 3.84
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.91
 FLOW VELOCITY(FEET/SEC.) = 0.70 DEPTH*VELOCITY(FT*FT/SEC.) = 0.32
 LONGEST FLOWPATH FROM NODE 82.00 TO NODE 86.00 = 1849.00 FEET.

 FLOW PROCESS FROM NODE 86.00 TO NODE 86.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 32.82
 RAINFALL INTENSITY(INCH/HR) = 0.75
 AREA-AVERAGED Fm(INCH/HR) = 0.37
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.54
 EFFECTIVE STREAM AREA(ACRES) = 10.75
 TOTAL STREAM AREA(ACRES) = 10.75
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.84

 FLOW PROCESS FROM NODE 84.00 TO NODE 85.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 352.00 DOWNSTREAM(FEET) = 350.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.687
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.128
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.59	0.69	0.100	61	
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	A	0.15	0.93	0.600	39	
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	5.57	0.69	0.600	61	

COMMERCIAL B 0.64 0.69 0.100 61 17.69
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" B 4.43 0.69 0.600 61 23.97
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
 SUBAREA RUNOFF(CFS) = 3.47
 TOTAL AREA(ACRES) = 5.07 PEAK FLOW RATE(CFS) = 3.47

 FLOW PROCESS FROM NODE 85.00 TO NODE 86.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

 UPSTREAM ELEVATION(FEET) = 350.50 DOWNSTREAM ELEVATION(FEET) = 350.00
 STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.19
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43
 HALFSTREET FLOOD WIDTH(FEET) = 15.20
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.93
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.40
 STREET FLOW TRAVEL TIME(MIN.) = 7.79 Tc(MIN.) = 25.47
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.890
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.09	0.93	0.100	39
COMMERCIAL	B	0.19	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	1.61	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.73	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561
 SUBAREA AREA(ACRES) = 3.62 SUBAREA RUNOFF(CFS) = 1.43
 EFFECTIVE AREA(ACRES) = 8.69 AREA-AVERAGED Fm(INCH/HR) = 0.40
 AREA-AVERAGED Fp(INCH/HR) = 0.74 AREA-AVERAGED Ap = 0.55
 TOTAL AREA(ACRES) = 8.7 PEAK FLOW RATE(CFS) = 3.81

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.65
 FLOW VELOCITY(FEET/SEC.) = 0.90 DEPTH*VELOCITY(FT*FT/SEC.) = 0.38
 LONGEST FLOWPATH FROM NODE 84.00 TO NODE 86.00 = 1434.00 FEET.

 FLOW PROCESS FROM NODE 86.00 TO NODE 86.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 25.47
RAINFALL INTENSITY(INCH/HR) = 0.89
AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.74
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA(ACRES) = 8.69
TOTAL STREAM AREA(ACRES) = 8.69
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.81

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.84	32.82	0.755	0.69(0.37)	0.54	10.8	82.00
2	3.81	25.47	0.890	0.74(0.40)	0.55	8.7	84.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 6.60 Tc(MIN.) = 32.82
EFFECTIVE AREA(ACRES) = 19.44 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 19.4
LONGEST FLOWPATH FROM NODE 82.00 TO NODE 86.00 = 1849.00 FEET.

FLOW PROCESS FROM NODE 86.00 TO NODE 87.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 350.00 DOWNSTREAM ELEVATION(FEET) = 345.00
STREET LENGTH(FEET) = 1518.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.59
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.66
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.59
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.70
STREET FLOW TRAVEL TIME(MIN.) = 15.89 Tc(MIN.) = 48.72

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.584
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL	A	0.32	0.93	0.100	39
COMMERCIAL	B	1.93	0.69	0.100	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	0.54	0.93	0.500	39
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.97	0.69	0.500	61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.72					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344					
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
SUBAREA AREA(ACRES) = 5.76				SUBAREA RUNOFF(CFS) = 1.99	
EFFECTIVE AREA(ACRES) = 25.20				AREA-AVERAGED Fm(INCH/HR) = 0.35	
AREA-AVERAGED Fp(INCH/HR) = 0.71				AREA-AVERAGED Ap = 0.50	
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
TOTAL AREA(ACRES) = 25.2				PEAK FLOW RATE(CFS) = 6.65	

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 14.80
FLOW VELOCITY(FEET/SEC.) = 1.55 DEPTH*VELOCITY(FT*FT/SEC.) = 0.66
LONGEST FLOWPATH FROM NODE 82.00 TO NODE 87.00 = 3367.00 FEET.

FLOW PROCESS FROM NODE 87.00 TO NODE 87.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.65	48.72	0.584	0.71(0.35)	0.50	25.2	82.00

LONGEST FLOWPATH FROM NODE 82.00 TO NODE 87.00 = 3367.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.79	43.08	0.633	0.69(0.27)	0.39	60.1	70.00

LONGEST FLOWPATH FROM NODE 70.00 TO NODE 87.00 = 4547.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 30.06 Tc(MIN.) = 43.084
EFFECTIVE AREA(ACRES) = 79.71 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.70 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 102.4
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 87.00 = 4547.00 FEET.

FLOW PROCESS FROM NODE 87.00 TO NODE 87.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 87.00 TO NODE 98.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 344.00
FLOW LENGTH(FEET) = 1162.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.44
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.06
PIPE TRAVEL TIME(MIN.) = 5.62 Tc(MIN.) = 48.71
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

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FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
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FLOW PROCESS FROM NODE 88.00 TO NODE 89.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 348.00 DOWNSTREAM(FEET) = 347.50

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 22.033
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.978
SUBAREA Tc AND LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.40	0.69	0.100	61	22.03
SCHOOL	B	3.69	0.69	0.600	61	29.86

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462
SUBAREA RUNOFF(CFS) = 3.03
TOTAL AREA(ACRES) = 5.09 PEAK FLOW RATE(CFS) = 3.03

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FLOW PROCESS FROM NODE 89.00 TO NODE 93.00 IS CODE = 62
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
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UPSTREAM ELEVATION(FEET) = 347.50 DOWNSTREAM ELEVATION(FEET) = 346.50
STREET LENGTH(FEET) = 1607.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.68

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STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 18.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.75
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.36
STREET FLOW TRAVEL TIME(MIN.) = 35.68 Tc(MIN.) = 57.71
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.523
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap        SCS
LAND USE                GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL              B       6.65     0.69     0.100    61
RESIDENTIAL
"3-4 DWELLINGS/ACRE"   B       2.25     0.69     0.600    61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.226
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 3.24
EFFECTIVE AREA(ACRES) = 13.99 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.31
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 4.53

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.85
FLOW VELOCITY(FEET/SEC.) = 0.75 DEPTH*VELOCITY(FT*FT/SEC.) = 0.36
LONGEST FLOWPATH FROM NODE 88.00 TO NODE 93.00 = 2607.00 FEET.

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*****
FLOW PROCESS FROM NODE 93.00 TO NODE 93.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 57.71
RAINFALL INTENSITY(INCH/HR) = 0.52
AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 13.99
TOTAL STREAM AREA(ACRES) = 13.99
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.53

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*****
FLOW PROCESS FROM NODE 90.00 TO NODE 91.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 922.00
ELEVATION DATA: UPSTREAM(FEET) = 348.00 DOWNSTREAM(FEET) = 347.50

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.985
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.010
SUBAREA Tc AND LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN Tc (MIN.)

COMMERCIAL	B	0.89	0.69	0.100	61	20.99
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	1.97	0.69	0.600	61	28.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.444
SUBAREA RUNOFF(CFS) = 1.81
TOTAL AREA(ACRES) = 2.86 PEAK FLOW RATE(CFS) = 1.81

FLOW PROCESS FROM NODE 91.00 TO NODE 92.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<
=====

UPSTREAM ELEVATION(FEET) = 347.50 DOWNSTREAM ELEVATION(FEET) = 347.00
STREET LENGTH(FEET) = 305.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.31
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 12.77
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.00
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.39
STREET FLOW TRAVEL TIME(MIN.) = 5.07 Tc(MIN.) = 26.06
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.877

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

COMMERCIAL	B	1.91	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.78	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.432
SUBAREA AREA(ACRES) = 5.69 SUBAREA RUNOFF(CFS) = 2.97
EFFECTIVE AREA(ACRES) = 8.55 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 4.45

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.49
FLOW VELOCITY(FEET/SEC.) = 1.07 DEPTH*VELOCITY(FT*FT/SEC.) = 0.45
LONGEST FLOWPATH FROM NODE 90.00 TO NODE 92.00 = 1227.00 FEET.

FLOW PROCESS FROM NODE 92.00 TO NODE 93.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<
=====

UPSTREAM ELEVATION(FEET) = 347.00 DOWNSTREAM ELEVATION(FEET) = 346.50
STREET LENGTH(FEET) = 652.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.06
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.51
HALFSTREET FLOOD WIDTH(FEET) = 19.26
AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.86
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.44
STREET FLOW TRAVEL TIME(MIN.) = 12.58 Tc(MIN.) = 38.64
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.679

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

COMMERCIAL	B	2.98	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	6.40	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.441
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 9.38 SUBAREA RUNOFF(CFS) = 3.20
EFFECTIVE AREA(ACRES) = 17.93 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 6.15

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.34
FLOW VELOCITY(FEET/SEC.) = 0.87 DEPTH*VELOCITY(FT*FT/SEC.) = 0.44
LONGEST FLOWPATH FROM NODE 90.00 TO NODE 93.00 = 1879.00 FEET.

FLOW PROCESS FROM NODE 93.00 TO NODE 93.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<<
=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 38.64
RAINFALL INTENSITY(INCH/HR) = 0.68
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69

AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 17.93
TOTAL STREAM AREA(ACRES) = 17.93
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.15

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.53	57.71	0.523	0.69(0.21)	0.31	14.0	88.00
2	6.15	38.64	0.679	0.69(0.30)	0.44	17.9	90.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 9.93 Tc(MIN.) = 38.64
EFFECTIVE AREA(ACRES) = 25.69 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 31.9
LONGEST FLOWPATH FROM NODE 88.00 TO NODE 93.00 = 2607.00 FEET.

FLOW PROCESS FROM NODE 93.00 TO NODE 94.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 346.50 DOWNSTREAM ELEVATION(FEET) = 346.00
STREET LENGTH(FEET) = 465.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.42

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.57
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.21
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.69
STREET FLOW TRAVEL TIME(MIN.) = 6.39 Tc(MIN.) = 45.02
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.615

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.93	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	6.89	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.451

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 9.82 SUBAREA RUNOFF(CFS) = 2.98
EFFECTIVE AREA(ACRES) = 35.51 AREA-AVERAGED Fm(INCH/HR) = 0.28

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.41
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 41.7 PEAK FLOW RATE(CFS) = 11.50

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.22 DEPTH*VELOCITY(FT*FT/SEC.) = 0.69
LONGEST FLOWPATH FROM NODE 88.00 TO NODE 94.00 = 3072.00 FEET.

FLOW PROCESS FROM NODE 94.00 TO NODE 95.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 346.00 DOWNSTREAM ELEVATION(FEET) = 345.00
STREET LENGTH(FEET) = 319.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.90

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.51
HALFSTREET FLOOD WIDTH(FEET) = 19.65
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.91
STREET FLOW TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 48.02
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.589

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.78	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	6.90	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 9.68 SUBAREA RUNOFF(CFS) = 2.79
EFFECTIVE AREA(ACRES) = 45.19 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 13.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.81 DEPTH*VELOCITY(FT*FT/SEC.) = 0.94
LONGEST FLOWPATH FROM NODE 88.00 TO NODE 95.00 = 3391.00 FEET.

FLOW PROCESS FROM NODE 95.00 TO NODE 98.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 345.00 DOWNSTREAM ELEVATION(FEET) = 344.00
STREET LENGTH(FEET) = 267.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.39

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.52

HALFSTREET FLOOD WIDTH(FEET) = 19.80

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.95

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.00

STREET FLOW TRAVEL TIME(MIN.) = 2.29 Tc(MIN.) = 50.31

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.572

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.80	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	1.49	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.326

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 3.29 SUBAREA RUNOFF(CFS) = 1.14

EFFECTIVE AREA(ACRES) = 48.48 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 54.7 PEAK FLOW RATE(CFS) = 14.55

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 19.88

FLOW VELOCITY(FEET/SEC.) = 1.95 DEPTH*VELOCITY(FT*FT/SEC.) = 1.01

LONGEST FLOWPATH FROM NODE 88.00 TO NODE 98.00 = 3658.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER NODE
--------	---	----	-----------	--------	----	----	-------------------

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	14.55	50.31	0.572	0.69(0.29)	0.42	48.5 88.00

LONGEST FLOWPATH FROM NODE 88.00 TO NODE 98.00 = 3658.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER NODE
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)		
1	30.06	48.71	0.584	0.70(0.29)	0.42	79.7	70.00

LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 44.38 Tc(MIN.) = 48.706

EFFECTIVE AREA(ACRES) = 125.47 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 157.1

LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====

FLOW PROCESS FROM NODE 96.00 TO NODE 97.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 653.00

ELEVATION DATA: UPSTREAM(FEET) = 346.00 DOWNSTREAM(FEET) = 345.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.853

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.264

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.89	0.69	0.100	61	14.85
RESIDENTIAL "3-5 DWELLINGS/ACRE"	B	2.79	0.69	0.600	61	20.13

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.479

SUBAREA RUNOFF(CFS) = 3.10

TOTAL AREA(ACRES) = 3.68 PEAK FLOW RATE(CFS) = 3.10

FLOW PROCESS FROM NODE 97.00 TO NODE 98.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION (FEET) = 345.00 DOWNSTREAM ELEVATION (FEET) = 344.00
STREET LENGTH (FEET) = 554.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.22
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.41
HALFSTREET FLOOD WIDTH (FEET) = 13.87
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.10
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.45
STREET FLOW TRAVEL TIME (MIN.) = 8.36 Tc (MIN.) = 23.21
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.945

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.90 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 3.15 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.489
SUBAREA AREA (ACRES) = 4.05 SUBAREA RUNOFF (CFS) = 2.22
EFFECTIVE AREA (ACRES) = 7.73 AREA-AVERAGED Fm (INCH/HR) = 0.33
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 7.7 PEAK FLOW RATE (CFS) = 4.27

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 13.95
FLOW VELOCITY (FEET/SEC.) = 1.11 DEPTH*VELOCITY (FT*FT/SEC.) = 0.45
LONGEST FLOWPATH FROM NODE 96.00 TO NODE 98.00 = 1207.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.27 23.21 0.945 0.69(0.33) 0.48 7.7 96.00
LONGEST FLOWPATH FROM NODE 96.00 TO NODE 98.00 = 1207.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 44.38 48.71 0.584 0.69(0.29) 0.42 125.5 70.00
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 46.13 Tc (MIN.) = 48.706
EFFECTIVE AREA (ACRES) = 133.20 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 164.9
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1<<<<<<
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+-----+
| END OF SYSTEM "E" |
| |
| |
+-----+

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 360.00 DOWNSTREAM (FEET) = 356.50

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.930
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.260
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 3.14 0.69 0.100 61 14.93
PUBLIC PARK B 0.70 0.69 0.850 61 23.72
COMMERCIAL B 0.92 0.69 0.100 61 14.93
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 0.82 0.69 0.600 61 20.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.268
SUBAREA RUNOFF (CFS) = 5.40
TOTAL AREA (ACRES) = 5.58 PEAK FLOW RATE (CFS) = 5.40

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<
=====

UPSTREAM ELEVATION (FEET) = 356.50 DOWNSTREAM ELEVATION (FEET) = 354.00
STREET LENGTH (FEET) = 1571.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.95
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.48
HALFSTREET FLOOD WIDTH(FEET) = 17.54
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.18
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.56
STREET FLOW TRAVEL TIME(MIN.) = 22.17 Tc(MIN.) = 37.10
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.697

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.41 0.69 0.100 61
PUBLIC PARK B 1.65 0.69 0.850 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 3.36 0.69 0.600 61
SCHOOL B 1.87 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.515
SUBAREA AREA(ACRES) = 9.29 SUBAREA RUNOFF(CFS) = 2.88
EFFECTIVE AREA(ACRES) = 14.87 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 5.45

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 15.90
FLOW VELOCITY(FEET/SEC.) = 1.11 DEPTH*VELOCITY(FT*FT/SEC.) = 0.50
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 2571.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 116.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 354.00 DOWNSTREAM ELEVATION(FEET) = 353.00
STREET LENGTH(FEET) = 1268.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.19
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.51
HALFSTREET FLOOD WIDTH(FEET) = 19.34
AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.88
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.44
STREET FLOW TRAVEL TIME(MIN.) = 24.13 Tc(MIN.) = 61.23

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.503
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.98 0.69 0.100 61
SCHOOL B 5.86 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.528
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 6.84 SUBAREA RUNOFF(CFS) = 1.46
EFFECTIVE AREA(ACRES) = 21.71 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.46
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 21.7 PEAK FLOW RATE(CFS) = 5.45
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.32
FLOW VELOCITY(FEET/SEC.) = 0.85 DEPTH*VELOCITY(FT*FT/SEC.) = 0.42
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 61.23
RAINFALL INTENSITY(INCH/HR) = 0.50
AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.46
EFFECTIVE STREAM AREA(ACRES) = 21.71
TOTAL STREAM AREA(ACRES) = 21.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.45

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 781.00
ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 359.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.537
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.179
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 2.27 0.69 0.100 61 16.54
PUBLIC PARK B 6.72 0.69 0.850 61 26.27
COMMERCIAL B 0.36 0.69 0.100 61 16.54
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.639
SUBAREA RUNOFF(CFS) = 6.23
TOTAL AREA (ACRES) = 9.35 PEAK FLOW RATE (CFS) = 6.23

FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 353.50
STREET LENGTH(FEET) = 835.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.51
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.51
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.25
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.99
STREET FLOW TRAVEL TIME(MIN.) = 6.20 Tc(MIN.) = 22.74
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.958

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.82	0.69	0.100	61
PUBLIC PARK	B	5.66	0.69	0.850	61
COMMERCIAL	B	0.09	0.69	0.100	61
SCHOOL	B	0.64	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 14.21 SUBAREA RUNOFF(CFS) = 8.56
EFFECTIVE AREA(ACRES) = 23.56 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 23.6 PEAK FLOW RATE(CFS) = 12.94

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.91
FLOW VELOCITY(FEET/SEC.) = 2.35 DEPTH*VELOCITY(FT*FT/SEC.) = 1.09
LONGEST FLOWPATH FROM NODE 113.00 TO NODE 115.00 = 1616.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 353.50 DOWNSTREAM ELEVATION(FEET) = 353.00
STREET LENGTH(FEET) = 405.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.88
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.41
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.84
STREET FLOW TRAVEL TIME(MIN.) = 4.80 Tc(MIN.) = 27.54
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.846

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.27	0.69	0.100	61
PUBLIC PARK	B	0.07	0.69	0.850	61
SCHOOL	B	9.39	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588
SUBAREA AREA(ACRES) = 9.73 SUBAREA RUNOFF(CFS) = 3.88
EFFECTIVE AREA(ACRES) = 33.29 AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 33.3 PEAK FLOW RATE(CFS) = 14.43

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.39 DEPTH*VELOCITY(FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 113.00 TO NODE 116.00 = 2021.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 27.54
RAINFALL INTENSITY(INCH/HR) = 0.85
AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.53
EFFECTIVE STREAM AREA(ACRES) = 33.29
TOTAL STREAM AREA(ACRES) = 33.29
PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.43

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
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1 5.45 61.23 0.503 0.69(0.31) 0.46 21.7 110.00
2 14.43 27.54 0.846 0.69(0.36) 0.53 33.3 113.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 18.39 Tc(MIN.) = 27.54
EFFECTIVE AREA(ACRES) = 38.92 AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 55.0
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 117.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 353.00 DOWNSTREAM ELEVATION(FEET) = 349.50
STREET LENGTH(FEET) = 707.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.68
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.54
HALfstREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.44
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.32
STREET FLOW TRAVEL TIME(MIN.) = 4.83 Tc(MIN.) = 32.37
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.64	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	5.35	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.368
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 4.58
EFFECTIVE AREA(ACRES) = 48.91 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 65.0 PEAK FLOW RATE(CFS) = 18.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.53 HALfstREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.35 DEPTH*VELOCITY(FT*FT/SEC.) = 1.25
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 117.00 = 4546.00 FEET.

FLOW PROCESS FROM NODE 117.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 349.50 DOWNSTREAM ELEVATION(FEET) = 347.50
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.85
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.57
HALfstREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.24
STREET FLOW TRAVEL TIME(MIN.) = 4.73 Tc(MIN.) = 37.10
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.697

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.16	0.69	0.100	61
COMMERCIAL	B	2.76	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.03	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.165
SUBAREA AREA(ACRES) = 7.95 SUBAREA RUNOFF(CFS) = 4.18
EFFECTIVE AREA(ACRES) = 56.86 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 72.9 PEAK FLOW RATE(CFS) = 20.09

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.57 HALfstREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.12 DEPTH*VELOCITY(FT*FT/SEC.) = 1.21
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 123.00 = 5159.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 37.10
RAINFALL INTENSITY(INCH/HR) = 0.70
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 56.86

TOTAL STREAM AREA(ACRES) = 72.94
PEAK FLOW RATE(CFS) AT CONFLUENCE = 20.09

FLOW PROCESS FROM NODE 118.00 TO NODE 119.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 359.00 DOWNSTREAM(FEET) = 353.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.404

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.351

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	7.15	0.69	0.100	61	13.40
COMMERCIAL	B	0.56	0.69	0.100	61	13.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 8.90

TOTAL AREA(ACRES) = 7.71 PEAK FLOW RATE(CFS) = 8.90

FLOW PROCESS FROM NODE 119.00 TO NODE 120.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 353.00 DOWNSTREAM ELEVATION(FEET) = 350.00
STREET LENGTH(FEET) = 655.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.11

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.48

HALFSTREET FLOOD WIDTH(FEET) = 17.77

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.01

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.96

STREET FLOW TRAVEL TIME(MIN.) = 5.44 Tc(MIN.) = 18.84

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.083

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.49	0.69	0.100	61
COMMERCIAL	B	0.76	0.69	0.100	61
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" B 1.03 0.69 0.500 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.157

SUBAREA AREA(ACRES) = 7.28 SUBAREA RUNOFF(CFS) = 6.39

EFFECTIVE AREA(ACRES) = 14.99 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.13

TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 13.43

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.48

FLOW VELOCITY(FEET/SEC.) = 2.07 DEPTH*VELOCITY(FT*FT/SEC.) = 1.02

LONGEST FLOWPATH FROM NODE 118.00 TO NODE 120.00 = 1655.00 FEET.

FLOW PROCESS FROM NODE 120.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 350.00 DOWNSTREAM ELEVATION(FEET) = 347.50

STREET LENGTH(FEET) = 1075.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.27

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.57

HALFSTREET FLOOD WIDTH(FEET) = 20.00

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.81

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.03

STREET FLOW TRAVEL TIME(MIN.) = 9.92 Tc(MIN.) = 28.76

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.823

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.20	0.69	0.100	61
COMMERCIAL	B	1.37	0.69	0.100	61
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" B 1.03 0.69 0.500 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.136

SUBAREA AREA(ACRES) = 11.60 SUBAREA RUNOFF(CFS) = 7.62

EFFECTIVE AREA(ACRES) = 26.59 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.13

TOTAL AREA(ACRES) = 26.6 PEAK FLOW RATE(CFS) = 17.53

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 1.82 DEPTH*VELOCITY(FT*FT/SEC.) = 1.04

LONGEST FLOWPATH FROM NODE 118.00 TO NODE 123.00 = 2730.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 28.76
RAINFALL INTENSITY(INCH/HR) = 0.82
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.13
EFFECTIVE STREAM AREA(ACRES) = 26.59
TOTAL STREAM AREA(ACRES) = 26.59
PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.53

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 352.50 DOWNSTREAM(FEET) = 349.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.930
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.260

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 2.23 0.69 0.100 61 14.93
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 4.74 0.69 0.600 61 20.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.440
SUBAREA RUNOFF(CFS) = 6.01
TOTAL AREA(ACRES) = 6.97 PEAK FLOW RATE(CFS) = 6.01

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 349.00 DOWNSTREAM ELEVATION(FEET) = 347.50
STREET LENGTH(FEET) = 1001.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.15

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.48
HALFSTREET FLOOD WIDTH(FEET) = 18.01
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.56
STREET FLOW TRAVEL TIME(MIN.) = 14.43 Tc(MIN.) = 29.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.68 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 3.10 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.424
SUBAREA AREA(ACRES) = 4.78 SUBAREA RUNOFF(CFS) = 2.24
EFFECTIVE AREA(ACRES) = 11.75 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 11.8 PEAK FLOW RATE(CFS) = 6.01
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.76
FLOW VELOCITY(FEET/SEC.) = 1.11 DEPTH*VELOCITY(FT*FT/SEC.) = 0.51
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 123.00 = 2001.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 29.36
RAINFALL INTENSITY(INCH/HR) = 0.81
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.43
EFFECTIVE STREAM AREA(ACRES) = 11.75
TOTAL STREAM AREA(ACRES) = 11.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.01

** CONFLUENCE DATA **
Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1-3.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 39.29 Tc(MIN.) = 37.10
EFFECTIVE AREA(ACRES) = 95.20 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 111.3

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 123.00 = 5159.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 347.50 DOWNSTREAM ELEVATION(FEET) = 346.00
STREET LENGTH(FEET) = 609.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.06

STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.73
HALFSTREET FLOOD WIDTH(FEET) = 23.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.57
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.87
STREET FLOW TRAVEL TIME(MIN.) = 3.95 Tc(MIN.) = 41.05
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.653

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include COMMERCIAL, RESIDENTIAL, and SCHOOL.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 9.19 SUBAREA RUNOFF(CFS) = 3.54
EFFECTIVE AREA(ACRES) = 104.39 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.35
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 120.5 PEAK FLOW RATE(CFS) = 39.60

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.72 HALFSTREET FLOOD WIDTH(FEET) = 22.63
FLOW VELOCITY(FEET/SEC.) = 2.53 DEPTH*VELOCITY(FT*FT/SEC.) = 1.82
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 124.00 = 5768.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 127.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 346.00 DOWNSTREAM ELEVATION(FEET) = 345.50
STREET LENGTH(FEET) = 726.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.94
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.90
HALFSTREET FLOOD WIDTH(FEET) = 31.67
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.45
STREET FLOW TRAVEL TIME(MIN.) = 7.52 Tc(MIN.) = 48.58
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.585

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include COMMERCIAL, RESIDENTIAL, and SCHOOL.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 8.05 SUBAREA RUNOFF(CFS) = 2.68
EFFECTIVE AREA(ACRES) = 112.44 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 39.60
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.89 HALFSTREET FLOOD WIDTH(FEET) = 31.18
FLOW VELOCITY(FEET/SEC.) = 1.59 DEPTH*VELOCITY(FT*FT/SEC.) = 1.42
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 127.00 = 6494.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 48.58
RAINFALL INTENSITY(INCH/HR) = 0.59
AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.36
EFFECTIVE STREAM AREA (ACRES) = 112.44
TOTAL STREAM AREA (ACRES) = 128.52
PEAK FLOW RATE (CFS) AT CONFLUENCE = 39.60

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 348.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.997
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.378

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	5.34	0.69	0.100	61	13.00
COMMERCIAL	B	0.86	0.69	0.100	61	13.00

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 7.31
TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 7.31

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 348.00 DOWNSTREAM ELEVATION (FEET) = 345.50
STREET LENGTH (FEET) = 1360.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.05
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.54
HALFSTREET FLOOD WIDTH (FEET) = 20.00
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.45
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.78
STREET FLOW TRAVEL TIME (MIN.) = 15.59 Tc (MIN.) = 28.59
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.826

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	B	10.10	0.69	0.100	61
COMMERCIAL	B	0.48	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.67	0.69	0.600	61
COMMERCIAL	B	1.85	0.69	0.100	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.159
SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 9.09
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.14
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 13.32

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 20.00
FLOW VELOCITY (FEET/SEC.) = 1.52 DEPTH*VELOCITY (FT*FT/SEC.) = 0.84
LONGEST FLOWPATH FROM NODE 125.00 TO NODE 127.00 = 2360.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 28.59
RAINFALL INTENSITY (INCH/HR) = 0.83
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.14
EFFECTIVE STREAM AREA (ACRES) = 20.30
TOTAL STREAM AREA (ACRES) = 20.30
PEAK FLOW RATE (CFS) AT CONFLUENCE = 13.32

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	39.60	48.58	0.585	0.69 (0.24)	0.36	112.4	113.00
2	13.32	28.59	0.826	0.69 (0.10)	0.14	20.3	125.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 48.52 Tc (MIN.) = 48.58
EFFECTIVE AREA (ACRES) = 132.74 AREA-AVERAGED Fm (INCH/HR) = 0.22
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.32
TOTAL AREA (ACRES) = 148.8
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 127.00 = 6494.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 345.50 DOWNSTREAM ELEVATION (FEET) = 345.00
STREET LENGTH (FEET) = 773.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.51
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.99
HALFSTREET FLOOD WIDTH (FEET) = 36.30
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.65
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.64
STREET FLOW TRAVEL TIME (MIN.) = 7.79 Tc (MIN.) = 56.37
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.531
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 17.21 0.69 0.100 61
COMMERCIAL B 0.58 0.69 0.100 61
COMMERCIAL B 0.75 0.69 0.100 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA (ACRES) = 18.54 SUBAREA RUNOFF (CFS) = 7.98
EFFECTIVE AREA (ACRES) = 151.28 AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.30
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA (ACRES) = 167.4 PEAK FLOW RATE (CFS) = 50.97

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.98 HALFSTREET FLOOD WIDTH (FEET) = 35.82
FLOW VELOCITY (FEET/SEC.) = 1.64 DEPTH*VELOCITY (FT*FT/SEC.) = 1.61
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 773.0 FT WITH ELEVATION-DROP = 0.5 FT, IS 16.9 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 128.00
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 128.00 = 7267.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 136.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<
>>>> (STREET TABLE SECTION # 1 USED) <<<<<<
=====

UPSTREAM ELEVATION (FEET) = 345.00 DOWNSTREAM ELEVATION (FEET) = 344.50
STREET LENGTH (FEET) = 895.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.28

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 1.03
HALFSTREET FLOOD WIDTH (FEET) = 38.26
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.56
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.61
STREET FLOW TRAVEL TIME (MIN.) = 9.53 Tc (MIN.) = 65.90
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.480

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 14.22 0.69 0.100 61
COMMERCIAL B 0.89 0.69 0.100 61
COMMERCIAL B 0.70 0.69 0.100 61
COMMERCIAL B 1.20 0.69 0.100 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA (ACRES) = 17.01 SUBAREA RUNOFF (CFS) = 6.61
EFFECTIVE AREA (ACRES) = 168.29 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.28
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA (ACRES) = 184.4 PEAK FLOW RATE (CFS) = 52.66

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 1.02 HALFSTREET FLOOD WIDTH (FEET) = 37.71
FLOW VELOCITY (FEET/SEC.) = 1.56 DEPTH*VELOCITY (FT*FT/SEC.) = 1.59
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 136.00 = 8162.00 FEET.

FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<<
=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 65.90
RAINFALL INTENSITY (INCH/HR) = 0.48
AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.28
EFFECTIVE STREAM AREA (ACRES) = 168.29
TOTAL STREAM AREA (ACRES) = 184.37
PEAK FLOW RATE (CFS) AT CONFLUENCE = 52.66

FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 21

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<<<<
>> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA <<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 351.50 DOWNSTREAM(FEET) = 349.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.969
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.206

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.94	0.69	0.100	61	15.97
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	3.84	0.69	0.600	61	21.64

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.432
SUBAREA RUNOFF(CFS) = 4.73
TOTAL AREA(ACRES) = 5.78 PEAK FLOW RATE(CFS) = 4.73

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 349.00 DOWNSTREAM ELEVATION(FEET) = 347.50
STREET LENGTH(FEET) = 401.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.17
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.41
HALFSTREET FLOOD WIDTH(FEET) = 14.02
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.58
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.65
STREET FLOW TRAVEL TIME(MIN.) = 4.22 Tc(MIN.) = 20.19
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.52	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.76	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.422
SUBAREA AREA(ACRES) = 4.28 SUBAREA RUNOFF(CFS) = 2.87
EFFECTIVE AREA(ACRES) = 10.06 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 10.1 PEAK FLOW RATE(CFS) = 6.71

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.49
FLOW VELOCITY(FEET/SEC.) = 1.62 DEPTH*VELOCITY(FT*FT/SEC.) = 0.68
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 131.00 = 1401.00 FEET.

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 347.50 DOWNSTREAM ELEVATION(FEET) = 347.00
STREET LENGTH(FEET) = 581.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.79

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.02
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.56
STREET FLOW TRAVEL TIME(MIN.) = 9.46 Tc(MIN.) = 29.65
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.806

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.45	0.69	0.100	61
COMMERCIAL	B	1.38	0.69	0.100	61
SCHOOL	B	4.41	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.368
SUBAREA AREA(ACRES) = 8.24 SUBAREA RUNOFF(CFS) = 4.11
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 8.75

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.02 DEPTH*VELOCITY(FT*FT/SEC.) = 0.56
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 132.00 = 1982.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 347.00 DOWNSTREAM ELEVATION(FEET) = 346.00
STREET LENGTH(FEET) = 741.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.00
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.53
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.24
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.66
STREET FLOW TRAVEL TIME(MIN.) = 9.99 Tc(MIN.) = 39.65
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.668

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.84 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.69 0.69 0.600 61
SCHOOL B 5.51 0.69 0.600 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.486
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 8.04 SUBAREA RUNOFF(CFS) = 2.49
EFFECTIVE AREA(ACRES) = 26.34 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 26.3 PEAK FLOW RATE(CFS) = 9.07

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.19 DEPTH*VELOCITY(FT*FT/SEC.) = 0.62
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 133.00 = 2723.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 346.00 DOWNSTREAM ELEVATION(FEET) = 345.50
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.44
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.59
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.02
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.60
STREET FLOW TRAVEL TIME(MIN.) = 11.78 Tc(MIN.) = 51.42
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.564

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.02 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 6.67 0.69 0.600 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.444
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 9.69 SUBAREA RUNOFF(CFS) = 2.73
EFFECTIVE AREA(ACRES) = 36.03 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 36.0 PEAK FLOW RATE(CFS) = 10.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.02 DEPTH*VELOCITY(FT*FT/SEC.) = 0.60
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 134.00 = 3447.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 345.50 DOWNSTREAM ELEVATION(FEET) = 345.00
STREET LENGTH(FEET) = 746.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.03
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.61

HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.07
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.66
 STREET FLOW TRAVEL TIME(MIN.) = 11.60 Tc(MIN.) = 63.02
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.494
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.82	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.42	0.69	0.600	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.03	0.69	0.500	61
COMMERCIAL	B	3.25	0.69	0.100	61

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.228
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 9.52 SUBAREA RUNOFF(CFS) = 3.27
 EFFECTIVE AREA(ACRES) = 45.55 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.39
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 45.5 PEAK FLOW RATE(CFS) = 12.37

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.08 DEPTH*VELOCITY(FT*FT/SEC.) = 0.67
 LONGEST FLOWPATH FROM NODE 129.00 TO NODE 135.00 = 4193.00 FEET.

 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

 UPSTREAM ELEVATION(FEET) = 345.00 DOWNSTREAM ELEVATION(FEET) = 344.50
 STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.28

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.61
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.18
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.72
 STREET FLOW TRAVEL TIME(MIN.) = 8.63 Tc(MIN.) = 71.65
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.454

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.94	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	4.44	0.69	0.600	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.01	0.69	0.500	61

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.401
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 7.39 SUBAREA RUNOFF(CFS) = 1.81
 EFFECTIVE AREA(ACRES) = 52.94 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.39
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 52.9 PEAK FLOW RATE(CFS) = 13.19

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.61 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.18 DEPTH*VELOCITY(FT*FT/SEC.) = 0.72
 LONGEST FLOWPATH FROM NODE 129.00 TO NODE 136.00 = 4806.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 71.65
 RAINFALL INTENSITY(INCH/HR) = 0.45
 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.39
 EFFECTIVE STREAM AREA(ACRES) = 52.94
 TOTAL STREAM AREA(ACRES) = 52.94
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.19

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	52.66	65.90	0.480	0.69(0.19)	0.28	168.3	113.00
2	13.19	71.65	0.454	0.69(0.27)	0.39	52.9	129.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 65.33 Tc(MIN.) = 65.90
 EFFECTIVE AREA(ACRES) = 213.02 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 237.3
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 136.00 = 8162.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 139.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 344.50 DOWNSTREAM ELEVATION(FEET) = 340.00
STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 66.33

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.77
HALFSTREET FLOOD WIDTH(FEET) = 25.07
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.69
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.83
STREET FLOW TRAVEL TIME(MIN.) = 4.41 Tc(MIN.) = 70.32
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.460

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.44	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	2.15	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.263

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 6.59 SUBAREA RUNOFF(CFS) = 2.01
EFFECTIVE AREA(ACRES) = 219.61 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.30

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 243.9 PEAK FLOW RATE(CFS) = 65.33

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.76 HALFSTREET FLOOD WIDTH(FEET) = 24.89
FLOW VELOCITY(FEET/SEC.) = 3.67 DEPTH*VELOCITY(FT*FT/SEC.) = 2.81
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 139.00 = 9139.00 FEET.

FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 70.32
RAINFALL INTENSITY(INCH/HR) = 0.46
AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.69

AREA-AVERAGED Ap = 0.30
EFFECTIVE STREAM AREA(ACRES) = 219.61
TOTAL STREAM AREA(ACRES) = 243.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 65.33

FLOW PROCESS FROM NODE 137.00 TO NODE 138.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 341.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.537

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.282

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	6.88	0.69	0.100	61	14.54
COMMERCIAL	B	0.36	0.69	0.100	61	14.54
COMMERCIAL	B	4.97	0.69	0.100	61	14.54

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 13.33

TOTAL AREA(ACRES) = 12.21 PEAK FLOW RATE(CFS) = 13.33

FLOW PROCESS FROM NODE 138.00 TO NODE 139.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 341.00 DOWNSTREAM ELEVATION(FEET) = 340.00
STREET LENGTH(FEET) = 437.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.75

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.58
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.82
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 4.00 Tc(MIN.) = 18.54
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.094

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	6.88	0.69	0.100	61
COMMERCIAL	B	0.36	0.69	0.100	61
COMMERCIAL	B	4.97	0.69	0.100	61

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.36 0.69 0.100 61
COMMERCIAL B 0.74 0.69 0.100 61
COMMERCIAL B 2.45 0.69 0.100 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 9.55 SUBAREA RUNOFF (CFS) = 8.82
EFFECTIVE AREA (ACRES) = 21.76 AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 21.8 PEAK FLOW RATE (CFS) = 20.09

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.59 HALFSTREET FLOOD WIDTH (FEET) = 20.00
FLOW VELOCITY (FEET/SEC.) = 1.91 DEPTH*VELOCITY (FT*FT/SEC.) = 1.13
LONGEST FLOWPATH FROM NODE 137.00 TO NODE 139.00 = 1437.00 FEET.

FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.54
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.094
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.99	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	6.56	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.484
SUBAREA AREA (ACRES) = 8.55 SUBAREA RUNOFF (CFS) = 5.87
EFFECTIVE AREA (ACRES) = 30.31 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.21
TOTAL AREA (ACRES) = 30.3 PEAK FLOW RATE (CFS) = 25.95

FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 18.54
RAINFALL INTENSITY (INCH/HR) = 1.09
AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.21
EFFECTIVE STREAM AREA (ACRES) = 30.31
TOTAL STREAM AREA (ACRES) = 30.31
PEAK FLOW RATE (CFS) AT CONFLUENCE = 25.95

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	65.33	70.32	0.460	0.69 (0.20)	0.30	219.6	113.00
2	25.95	18.54	1.094	0.69 (0.14)	0.21	30.3	137.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 73.98 Tc (MIN.) = 70.32
EFFECTIVE AREA (ACRES) = 249.92 AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.29
TOTAL AREA (ACRES) = 274.2
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 139.00 = 9139.00 FEET.

FLOW PROCESS FROM NODE 139.00 TO NODE 153.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 337.00
FLOW LENGTH (FEET) = 443.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.28
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 73.98
PIPE TRAVEL TIME (MIN.) = 0.80 Tc (MIN.) = 71.11
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 153.00 = 9582.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 345.00 DOWNSTREAM (FEET) = 344.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 19.181
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.070
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.04	0.69	0.100	61	19.18
COMMERCIAL	B	0.39	0.69	0.100	61	19.18
RESIDENTIAL "3-5 DWELLINGS/ACRE"	B	1.98	0.69	0.600	61	26.00
COMMERCIAL	B	3.92	0.69	0.100	61	19.18

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235
SUBAREA RUNOFF (CFS) = 6.00
TOTAL AREA (ACRES) = 7.33 PEAK FLOW RATE (CFS) = 6.00

FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 344.00 DOWNSTREAM ELEVATION(FEET) = 341.00
STREET LENGTH(FEET) = 787.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.77
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 16.91
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.78
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.83
STREET FLOW TRAVEL TIME(MIN.) = 7.38 Tc(MIN.) = 26.56
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.866

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.05 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 14.47 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.538
SUBAREA AREA(ACRES) = 16.52 SUBAREA RUNOFF(CFS) = 7.39
EFFECTIVE AREA(ACRES) = 23.85 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 12.04

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.40
FLOW VELOCITY(FEET/SEC.) = 1.87 DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 1787.00 FEET.

FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 341.00 DOWNSTREAM ELEVATION(FEET) = 339.00
STREET LENGTH(FEET) = 1194.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.50
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.57
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.53
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.87
STREET FLOW TRAVEL TIME(MIN.) = 13.05 Tc(MIN.) = 39.61
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.668

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.66 0.69 0.100 61
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.26 0.69 0.400 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 12.41 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.503
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 16.33 SUBAREA RUNOFF(CFS) = 4.88
EFFECTIVE AREA(ACRES) = 40.18 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 40.2 PEAK FLOW RATE(CFS) = 12.84

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.45 DEPTH*VELOCITY(FT*FT/SEC.) = 0.80
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 143.00 = 2981.00 FEET.

FLOW PROCESS FROM NODE 143.00 TO NODE 146.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 339.00 DOWNSTREAM(FEET) = 338.00
FLOW LENGTH(FEET) = 740.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.30
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.84
PIPE TRAVEL TIME(MIN.) = 3.74 Tc(MIN.) = 43.35
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 3721.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 43.35
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.630
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.69	0.100	61
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.32	0.69	0.400	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	7.54	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.536
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 8.86 SUBAREA RUNOFF(CFS) = 2.33
 EFFECTIVE AREA(ACRES) = 49.04 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 49.0 PEAK FLOW RATE(CFS) = 14.44

 FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 43.35
 RAINFALL INTENSITY(INCH/HR) = 0.63
 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.48
 EFFECTIVE STREAM AREA(ACRES) = 49.04
 TOTAL STREAM AREA(ACRES) = 49.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.44

 FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 344.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 22.033
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.978

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.24	0.69	0.100	61	22.03
COMMERCIAL	B	0.23	0.69	0.100	61	22.03
RESIDENTIAL						
"5-8 DWELLINGS/ACRE"	B	2.36	0.69	0.500	61	28.19
PUBLIC PARK	B	5.48	0.69	0.850	61	35.01
COMMERCIAL	B	0.69	0.69	0.100	61	22.03

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.605
 SUBAREA RUNOFF(CFS) = 5.06

TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 5.06

FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 344.50 DOWNSTREAM ELEVATION(FEET) = 338.00
 STREET LENGTH(FEET) = 1321.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.09

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43
 HALFSTREET FLOOD WIDTH(FEET) = 14.80
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.88
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.80
 STREET FLOW TRAVEL TIME(MIN.) = 11.71 Tc(MIN.) = 33.74
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.741

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.22	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	7.68	0.69	0.600	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.89	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.467
 SUBAREA AREA(ACRES) = 15.79 SUBAREA RUNOFF(CFS) = 5.98
 EFFECTIVE AREA(ACRES) = 25.79 AREA-AVERAGED Fm(INCH/HR) = 0.36
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.52
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 8.92

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.43
 FLOW VELOCITY(FEET/SEC.) = 1.92 DEPTH*VELOCITY(FT*FT/SEC.) = 0.84
 LONGEST FLOWPATH FROM NODE 144.00 TO NODE 146.00 = 2321.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 33.74

RAINFALL INTENSITY (INCH/HR) = 0.74
 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.52
 EFFECTIVE STREAM AREA (ACRES) = 25.79
 TOTAL STREAM AREA (ACRES) = 25.79
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 8.92

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	14.44	43.35	0.630	0.69 (0.33)	0.48	49.0	140.00
2	8.92	33.74	0.741	0.69 (0.36)	0.52	25.8	144.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 20.77 Tc (MIN.) = 43.35
 EFFECTIVE AREA (ACRES) = 74.83 AREA-AVERAGED Fm (INCH/HR) = 0.34
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
 TOTAL AREA (ACRES) = 74.8
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 3721.00 FEET.

 FLOW PROCESS FROM NODE 146.00 TO NODE 153.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 338.00 DOWNSTREAM (FEET) = 336.00
 FLOW LENGTH (FEET) = 1379.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.84
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 20.77
 PIPE TRAVEL TIME (MIN.) = 5.99 Tc (MIN.) = 49.34
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 153.00 = 5100.00 FEET.

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 49.34

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.579

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.44	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	13.60	0.69	0.600	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.20	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.551

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 15.24 SUBAREA RUNOFF (CFS) = 3.56

EFFECTIVE AREA (ACRES) = 90.07 AREA-AVERAGED Fm (INCH/HR) = 0.35

AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.50

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 90.1 PEAK FLOW RATE (CFS) = 23.28

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 11

>>>> CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
 =====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.28	49.34	0.579	0.69 (0.35)	0.50	90.1	140.00

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 153.00 = 5100.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	73.98	71.11	0.457	0.69 (0.20)	0.29	249.9	110.00

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 153.00 = 9582.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 85.03 Tc (MIN.) = 71.115
 EFFECTIVE AREA (ACRES) = 339.99 AREA-AVERAGED Fm (INCH/HR) = 0.24
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.34
 TOTAL AREA (ACRES) = 364.3
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 153.00 = 9582.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 12

>>>> CLEAR MEMORY BANK # 1<<<<<
 =====

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 10

>>>> MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<
 =====

FLOW PROCESS FROM NODE 147.00 TO NODE 148.00 IS CODE = 21

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 341.50 DOWNSTREAM (FEET) = 341.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 22.033

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.45	0.69	0.100	61	22.03
RESIDENTIAL						

"8-10 DWELLINGS/ACRE" B 5.21 0.69 0.400 61 27.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.335
SUBAREA RUNOFF(CFS) = 4.49
TOTAL AREA(ACRES) = 6.66 PEAK FLOW RATE(CFS) = 4.49

FLOW PROCESS FROM NODE 148.00 TO NODE 151.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 341.00 DOWNSTREAM ELEVATION(FEET) = 340.50
STREET LENGTH(FEET) = 1213.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.10
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.71
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.39
STREET FLOW TRAVEL TIME(MIN.) = 28.59 Tc(MIN.) = 50.62
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.570

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.90 0.69 0.100 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 3.18
EFFECTIVE AREA(ACRES) = 13.56 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.22
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 5.45

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 0.68 DEPTH*VELOCITY(FT*FT/SEC.) = 0.36
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 151.00 = 2213.00 FEET.

FLOW PROCESS FROM NODE 151.00 TO NODE 151.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 50.62
RAINFALL INTENSITY(INCH/HR) = 0.57
AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.22
EFFECTIVE STREAM AREA(ACRES) = 13.56
TOTAL STREAM AREA(ACRES) = 13.56
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.45

FLOW PROCESS FROM NODE 149.00 TO NODE 150.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 341.50 DOWNSTREAM(FEET) = 341.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 22.033
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.978
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.13 0.69 0.100 61 22.03
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.18 0.69 0.400 61 27.11
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 4.84 0.69 0.600 61 29.86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.514
SUBAREA RUNOFF(CFS) = 4.59
TOTAL AREA(ACRES) = 8.15 PEAK FLOW RATE(CFS) = 4.59

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 341.00 DOWNSTREAM ELEVATION(FEET) = 340.50
STREET LENGTH(FEET) = 640.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.07
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.51
 HALFSTREET FLOOD WIDTH(FEET) = 19.18
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.87
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.44
 STREET FLOW TRAVEL TIME(MIN.) = 12.22 Tc(MIN.) = 34.25
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.734
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 4.97 0.69 0.100 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 4.97 SUBAREA RUNOFF(CFS) = 2.98
 EFFECTIVE AREA(ACRES) = 13.12 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 13.1 PEAK FLOW RATE(CFS) = 5.78

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 18.79
 FLOW VELOCITY(FEET/SEC.) = 0.86 DEPTH*VELOCITY(FT*FT/SEC.) = 0.43
 LONGEST FLOWPATH FROM NODE 149.00 TO NODE 151.00 = 1640.00 FEET.

 FLOW PROCESS FROM NODE 151.00 TO NODE 151.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 34.25
 RAINFALL INTENSITY(INCH/HR) = 0.73
 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.36
 EFFECTIVE STREAM AREA(ACRES) = 13.12
 TOTAL STREAM AREA(ACRES) = 13.12
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.78

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	5.45	50.62	0.570	0.69(0.15)	0.22	13.6	147.00
2	5.78	34.25	0.734	0.69(0.25)	0.36	13.1	149.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 10.35 Tc(MIN.) = 34.25
 EFFECTIVE AREA(ACRES) = 21.30 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 26.7
 LONGEST FLOWPATH FROM NODE 147.00 TO NODE 151.00 = 2213.00 FEET.

 FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 340.50 DOWNSTREAM ELEVATION(FEET) = 340.00
 STREET LENGTH(FEET) = 633.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.61
 STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.59
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.11
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.66
 STREET FLOW TRAVEL TIME(MIN.) = 9.49 Tc(MIN.) = 43.74
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.626

SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 4.96 0.69 0.100 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 4.96 SUBAREA RUNOFF(CFS) = 2.52
 EFFECTIVE AREA(ACRES) = 26.26 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.26
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 10.89

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.08 DEPTH*VELOCITY(FT*FT/SEC.) = 0.63
 LONGEST FLOWPATH FROM NODE 147.00 TO NODE 152.00 = 2846.00 FEET.

 FLOW PROCESS FROM NODE 152.00 TO NODE 152.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 43.74
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.626

SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.21 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 4.86 0.69 0.600 61
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 5.74 0.69 0.500 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.442
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA (ACRES) = 13.81 SUBAREA RUNOFF (CFS) = 4.34
 EFFECTIVE AREA (ACRES) = 40.07 AREA-AVERAGED Fm (INCH/HR) = 0.22
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.33
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA (ACRES) = 45.4 PEAK FLOW RATE (CFS) = 15.23

 FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 337.00
 FLOW LENGTH (FEET) = 608.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.68
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 15.23
 PIPE TRAVEL TIME (MIN.) = 1.78 Tc (MIN.) = 45.52
 LONGEST FLOWPATH FROM NODE 147.00 TO NODE 153.00 = 3454.00 FEET.

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	15.23	45.52	0.610	0.69 (0.22)	0.33	40.1	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 153.00 = 3454.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	85.03	71.11	0.457	0.69 (0.24)	0.34	340.0	110.00

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 153.00 = 9582.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 94.22 Tc (MIN.) = 71.115
 EFFECTIVE AREA (ACRES) = 380.05 AREA-AVERAGED Fm (INCH/HR) = 0.24
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.34
 TOTAL AREA (ACRES) = 409.7
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 153.00 = 9582.00 FEET.

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

| END OF SYSTEM "F" |

| |
 | |
 +-----+

 FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 345.00 DOWNSTREAM (FEET) = 342.50

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.969
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.206
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	0.10	0.93	0.100	39	15.97
COMMERCIAL	B	0.76	0.69	0.100	61	15.97
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	A	0.42	0.93	0.600	39	21.64
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	8.51	0.69	0.600	61	21.64

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.70
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.556
 SUBAREA RUNOFF (CFS) = 7.21
 TOTAL AREA (ACRES) = 9.79 PEAK FLOW RATE (CFS) = 7.21

 FLOW PROCESS FROM NODE 161.00 TO NODE 162.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 342.50 DOWNSTREAM (FEET) = 341.50
 FLOW LENGTH (FEET) = 286.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.12
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 7.21
 PIPE TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 17.13
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 162.00 = 1286.00 FEET.

 FLOW PROCESS FROM NODE 162.00 TO NODE 162.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.13
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.152
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.07	0.93	0.100	39
COMMERCIAL	B	0.42	0.69	0.100	61
RESIDENTIAL					

"3-4 DWELLINGS/ACRE" A 3.51 0.93 0.600 39
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 10.67 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583
 SUBAREA AREA (ACRES) = 14.67 SUBAREA RUNOFF (CFS) = 9.47
 EFFECTIVE AREA (ACRES) = 24.46 AREA-AVERAGED Fm (INCH/HR) = 0.42
 AREA-AVERAGED Fp (INCH/HR) = 0.73 AREA-AVERAGED Ap = 0.57
 TOTAL AREA (ACRES) = 24.5 PEAK FLOW RATE (CFS) = 16.20

 FLOW PROCESS FROM NODE 162.00 TO NODE 163.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 341.50 DOWNSTREAM(FEET) = 341.00
 FLOW LENGTH(FEET) = 873.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 2.54
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 16.20
 PIPE TRAVEL TIME (MIN.) = 5.72 Tc (MIN.) = 22.85
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 163.00 = 2159.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 22.85
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.955
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.41	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	1.02	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	16.67	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.70
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.589
 SUBAREA AREA (ACRES) = 18.10 SUBAREA RUNOFF (CFS) = 8.85
 EFFECTIVE AREA (ACRES) = 42.56 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 0.72 AREA-AVERAGED Ap = 0.58
 TOTAL AREA (ACRES) = 42.6 PEAK FLOW RATE (CFS) = 20.71

 FLOW PROCESS FROM NODE 163.00 TO NODE 164.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 341.00 DOWNSTREAM(FEET) = 340.50
 FLOW LENGTH(FEET) = 609.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.07
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 20.71
 PIPE TRAVEL TIME (MIN.) = 3.31 Tc (MIN.) = 26.16
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 164.00 = 2768.00 FEET.

 FLOW PROCESS FROM NODE 164.00 TO NODE 164.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 26.16
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.875
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.34	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	17.90	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.591
 SUBAREA AREA (ACRES) = 18.24 SUBAREA RUNOFF (CFS) = 7.71
 EFFECTIVE AREA (ACRES) = 60.80 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.58
 TOTAL AREA (ACRES) = 60.8 PEAK FLOW RATE (CFS) = 25.35

 FLOW PROCESS FROM NODE 164.00 TO NODE 165.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.50 DOWNSTREAM(FEET) = 340.00
 FLOW LENGTH(FEET) = 488.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.55
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 25.35
 PIPE TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 28.45
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 165.00 = 3256.00 FEET.

 FLOW PROCESS FROM NODE 165.00 TO NODE 165.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 28.45
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.828
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.26	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	14.44	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.591
 SUBAREA AREA (ACRES) = 14.70 SUBAREA RUNOFF (CFS) = 5.59
 EFFECTIVE AREA (ACRES) = 75.50 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 0.70 AREA-AVERAGED Ap = 0.58
 TOTAL AREA (ACRES) = 75.5 PEAK FLOW RATE (CFS) = 28.40

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| END OF SYSTEM "G" |
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FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 341.50 DOWNSTREAM (FEET) = 340.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.687
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.128
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          B       1.21   0.69   0.100  61   17.69
COMMERCIAL          B       7.51   0.69   0.100  61   17.69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 8.32
TOTAL AREA (ACRES) = 8.72 PEAK FLOW RATE (CFS) = 8.32

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*****
FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 339.50
FLOW LENGTH (FEET) = 832.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 2.19
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 8.32
PIPE TRAVEL TIME (MIN.) = 6.33 Tc (MIN.) = 24.02
LONGEST FLOWPATH FROM NODE 170.00 TO NODE 172.00 = 1832.00 FEET.

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FLOW PROCESS FROM NODE 172.00 TO NODE 172.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 24.02
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.925
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       0.21   0.69   0.100  61
COMMERCIAL          B      11.64   0.69   0.100  61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

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SUBAREA AREA (ACRES) = 11.85 SUBAREA RUNOFF (CFS) = 9.13
EFFECTIVE AREA (ACRES) = 20.57 AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 20.6 PEAK FLOW RATE (CFS) = 15.85

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| END OF SYSTEM "H" |
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FLOW PROCESS FROM NODE 175.00 TO NODE 177.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 335.00 DOWNSTREAM (FEET) = 331.50

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 45.920
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.607
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
AGRICULTURAL GOOD COVER
"ROW CROPS, STRAIGHT ROW" A       6.18   0.60   1.000  67   45.92
AGRICULTURAL GOOD COVER
"ROW CROPS, STRAIGHT ROW" B       3.81   0.42   1.000  78   45.92
AGRICULTURAL GOOD COVER
"ROW CROPS, STRAIGHT ROW" A       4.50   0.60   1.000  67   45.92
AGRICULTURAL GOOD COVER
"ROW CROPS, STRAIGHT ROW" B      10.56   0.42   1.000  78   45.92
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.49
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 2.55
TOTAL AREA (ACRES) = 25.05 PEAK FLOW RATE (CFS) = 2.55

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FLOW PROCESS FROM NODE 177.00 TO NODE 178.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM (FEET) = 331.50 DOWNSTREAM (FEET) = 330.50
FLOW LENGTH (FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 2.35
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 2.55
PIPE TRAVEL TIME (MIN.) = 4.62 Tc (MIN.) = 50.54
LONGEST FLOWPATH FROM NODE 175.00 TO NODE 178.00 = 1653.00 FEET.

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*****
FLOW PROCESS FROM NODE 178.00 TO NODE 178.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 50.54
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.570
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW"  A      5.16    0.60    1.000   67
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW"  B     16.03    0.42    1.000   78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.46
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 21.19    SUBAREA RUNOFF(CFS) = 2.09
EFFECTIVE AREA(ACRES) = 46.24    AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.48    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 46.2    PEAK FLOW RATE(CFS) = 3.82

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FLOW PROCESS FROM NODE 178.00 TO NODE 179.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 330.50 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 569.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.08
ESTIMATED PIPE DIAMETER(INCH) = 21.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.82
PIPE TRAVEL TIME(MIN.) = 4.56    Tc(MIN.) = 55.10
LONGEST FLOWPATH FROM NODE 175.00 TO NODE 179.00 = 2222.00 FEET.

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*****
FLOW PROCESS FROM NODE 179.00 TO NODE 179.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 55.10
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.539
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW"  A      8.17    0.60    1.000   67
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW"  B     22.14    0.42    1.000   78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.47
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 30.31    SUBAREA RUNOFF(CFS) = 2.02
EFFECTIVE AREA(ACRES) = 76.55    AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.47    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 76.5    PEAK FLOW RATE(CFS) = 4.54

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*****
FLOW PROCESS FROM NODE 179.00 TO NODE 180.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 329.50
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.08
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.54
PIPE TRAVEL TIME(MIN.) = 5.30    Tc(MIN.) = 60.40
LONGEST FLOWPATH FROM NODE 175.00 TO NODE 180.00 = 2882.00 FEET.

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*****
FLOW PROCESS FROM NODE 180.00 TO NODE 180.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 60.40
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.508
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW"  A     20.59    0.60    1.000   67
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW"  B     18.99    0.42    1.000   78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.51
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 39.58    SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 116.13    AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.49    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 116.1    PEAK FLOW RATE(CFS) = 4.54
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 180.00 TO NODE 181.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 329.50 DOWNSTREAM(FEET) = 328.50
FLOW LENGTH(FEET) = 684.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.65
ESTIMATED PIPE DIAMETER(INCH) = 21.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.54
PIPE TRAVEL TIME(MIN.) = 4.30    Tc(MIN.) = 64.71
LONGEST FLOWPATH FROM NODE 175.00 TO NODE 181.00 = 3566.00 FEET.

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*****
FLOW PROCESS FROM NODE 181.00 TO NODE 181.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 64.71
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS

```


* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 16.68 SUBAREA RUNOFF(CFS) = 0.00
 EFFECTIVE AREA(ACRES) = 41.67 AREA-AVERAGED Fm(INCH/HR) = 0.59
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 41.7 PEAK FLOW RATE(CFS) = 0.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 193.00 TO NODE 194.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 323.50 DOWNSTREAM(FEET) = 321.50
 FLOW LENGTH(FEET) = 606.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 1.84
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.39
 PIPE TRAVEL TIME(MIN.) = 5.50 Tc(MIN.) = 70.41
 LONGEST FLOWPATH FROM NODE 190.00 TO NODE 194.00 = 3017.00 FEET.

 FLOW PROCESS FROM NODE 194.00 TO NODE 194.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 70.41
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.460
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 AGRICULTURAL GOOD COVER
 "ROW CROPS,STRAIGHT ROW" A 18.12 0.60 1.000 67
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 18.12 SUBAREA RUNOFF(CFS) = 0.00
 EFFECTIVE AREA(ACRES) = 59.79 AREA-AVERAGED Fm(INCH/HR) = 0.59
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 59.8 PEAK FLOW RATE(CFS) = 0.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 194.00 TO NODE 195.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 321.50 DOWNSTREAM(FEET) = 320.00
 FLOW LENGTH(FEET) = 606.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 1.67
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.39
 PIPE TRAVEL TIME(MIN.) = 6.05 Tc(MIN.) = 76.46
 LONGEST FLOWPATH FROM NODE 190.00 TO NODE 195.00 = 3623.00 FEET.

 FLOW PROCESS FROM NODE 195.00 TO NODE 195.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 76.46
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.436
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 AGRICULTURAL GOOD COVER
 "ROW CROPS,STRAIGHT ROW" A 18.27 0.60 1.000 67
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 18.27 SUBAREA RUNOFF(CFS) = 0.00
 EFFECTIVE AREA(ACRES) = 78.06 AREA-AVERAGED Fm(INCH/HR) = 0.59
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 0.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

+-----+
 | END OF SYSTEM "I2" |
 | | |
 | | |
 +-----+

 FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 362.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.397
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.235
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 0.03 0.69 0.100 61 15.40
 COMMERCIAL B 9.96 0.69 0.100 61 15.40
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 10.48
 TOTAL AREA(ACRES) = 9.99 PEAK FLOW RATE(CFS) = 10.48

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*****
FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 362.00  DOWNSTREAM ELEVATION(FEET) = 360.00
STREET LENGTH(FEET) = 732.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.73
***STREET FLOWING FULL***
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.88
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.04
STREET FLOW TRAVEL TIME(MIN.) = 6.51  Tc(MIN.) = 21.90
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.982
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           B      0.12    0.69   0.100  61
COMMERCIAL           B     14.97   0.69   0.100  61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 15.09  SUBAREA RUNOFF(CFS) = 12.40
EFFECTIVE AREA(ACRES) = 25.08  AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.69  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 25.1  PEAK FLOW RATE(CFS) = 20.61

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.59  HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.03  DEPTH*VELOCITY(FT*FT/SEC.) = 1.19
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 1732.00 FEET.

*****
FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 360.00  DOWNSTREAM ELEVATION(FEET) = 359.50
STREET LENGTH(FEET) = 1148.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018

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OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.23
***STREET FLOWING FULL***
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.85
HALFSTREET FLOOD WIDTH(FEET) = 28.98
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.23
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.04
STREET FLOW TRAVEL TIME(MIN.) = 15.61  Tc(MIN.) = 37.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.692
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           B      2.22    0.69   0.100  61
COMMERCIAL           B     21.17   0.69   0.100  61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 23.39  SUBAREA RUNOFF(CFS) = 13.13
EFFECTIVE AREA(ACRES) = 48.47  AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.69  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 48.5  PEAK FLOW RATE(CFS) = 27.20

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.85  HALFSTREET FLOOD WIDTH(FEET) = 28.98
FLOW VELOCITY(FEET/SEC.) = 1.22  DEPTH*VELOCITY(FT*FT/SEC.) = 1.04
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1148.0 FT WITH ELEVATION-DROP = 0.5 FT, IS 18.1 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 203.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 2880.00 FEET.

*****
FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 359.50  DOWNSTREAM ELEVATION(FEET) = 355.00
STREET LENGTH(FEET) = 1481.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.33
***STREET FLOWING FULL***
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

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STREET FLOW DEPTH(FEET) = 0.64
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.41
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.53
 STREET FLOW TRAVEL TIME(MIN.) = 10.22 Tc(MIN.) = 47.73
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.592
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 4.09 0.69 0.100 61
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 8.56 0.69 0.500 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.371
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 12.65 SUBAREA RUNOFF(CFS) = 4.24
 EFFECTIVE AREA(ACRES) = 61.12 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.16
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 61.1 PEAK FLOW RATE(CFS) = 27.47

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 2.36 DEPTH*VELOCITY(FT*FT/SEC.) = 1.47
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 4361.00 FEET.

 FLOW PROCESS FROM NODE 204.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 352.50
 STREET LENGTH(FEET) = 1197.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.31
 STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.66
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.13
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.41
 STREET FLOW TRAVEL TIME(MIN.) = 9.39 Tc(MIN.) = 57.12
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.527
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 1.90 0.69 0.100 61
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 3.61 0.69 0.500 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.362
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) = 5.51 SUBAREA RUNOFF(CFS) = 1.67
 EFFECTIVE AREA(ACRES) = 66.63 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.17
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) = 66.6 PEAK FLOW RATE(CFS) = 27.47
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 2.10 DEPTH*VELOCITY(FT*FT/SEC.) = 1.38
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 216.00 = 5558.00 FEET.

 FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
 =====

 FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 363.00 DOWNSTREAM(FEET) = 361.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.698
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.171
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 3.58 0.69 0.100 61 16.70
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" B 4.89 0.69 0.600 61 22.63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.389
 SUBAREA RUNOFF(CFS) = 6.90
 TOTAL AREA(ACRES) = 8.47 PEAK FLOW RATE(CFS) = 6.90

 FLOW PROCESS FROM NODE 206.00 TO NODE 209.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 361.00 DOWNSTREAM ELEVATION(FEET) = 359.00
 STREET LENGTH(FEET) = 1280.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.78

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.52
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.28
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.67

STREET FLOW TRAVEL TIME(MIN.) = 16.70 Tc(MIN.) = 33.40

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.746

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.78	0.69	0.100	61

RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	8.59	0.69	0.600	61
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421

SUBAREA AREA(ACRES) = 13.37 SUBAREA RUNOFF(CFS) = 5.50

EFFECTIVE AREA(ACRES) = 21.84 AREA-AVERAGED Fm(INCH/HR) = 0.28

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.41

TOTAL AREA(ACRES) = 21.8 PEAK FLOW RATE(CFS) = 9.16

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.73
FLOW VELOCITY(FEET/SEC.) = 1.25 DEPTH*VELOCITY(FT*FT/SEC.) = 0.64
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 209.00 = 2280.00 FEET.

FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 33.40
RAINFALL INTENSITY(INCH/HR) = 0.75
AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.41
EFFECTIVE STREAM AREA(ACRES) = 21.84
TOTAL STREAM AREA(ACRES) = 21.84
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.16

FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 367.50 DOWNSTREAM(FEET) = 362.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.640

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.336

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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AGRICULTURAL GOOD COVER

"ORCHARDS" B 7.44 0.72 1.000 58 41.95

AGRICULTURAL GOOD COVER

"ORCHARDS" C 2.42 0.52 1.000 72 41.95

COMMERCIAL B 0.14 0.69 0.100 61 13.64

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.67

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987

SUBAREA RUNOFF(CFS) = 6.04

TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 6.04

FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 362.00 DOWNSTREAM ELEVATION(FEET) = 359.00

STREET LENGTH(FEET) = 806.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43

HALFSTREET FLOOD WIDTH(FEET) = 15.12

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.66

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.72

STREET FLOW TRAVEL TIME(MIN.) = 8.09 Tc(MIN.) = 21.73

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.987

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
AGRICULTURAL GOOD COVER "ORCHARDS"	B	0.58	0.72	1.000	58
COMMERCIAL	B	2.22	0.69	0.100	61

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 1.56 0.69 0.600 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.70

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.399

SUBAREA AREA(ACRES) = 4.36 SUBAREA RUNOFF(CFS) = 2.78
 EFFECTIVE AREA(ACRES) = 14.36 AREA-AVERAGED Fm(INCH/HR) = 0.55
 AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.81
 TOTAL AREA(ACRES) = 14.4 PEAK FLOW RATE(CFS) = 6.04
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.87
 FLOW VELOCITY(FEET/SEC.) = 1.58 DEPTH*VELOCITY(FT*FT/SEC.) = 0.65
 LONGEST FLOWPATH FROM NODE 207.00 TO NODE 209.00 = 1806.00 FEET.

 FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 21.73
 RAINFALL INTENSITY(INCH/HR) = 0.99
 AREA-AVERAGED Fm(INCH/HR) = 0.55
 AREA-AVERAGED Fp(INCH/HR) = 0.68
 AREA-AVERAGED Ap = 0.81
 EFFECTIVE STREAM AREA(ACRES) = 14.36
 TOTAL STREAM AREA(ACRES) = 14.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.04

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.16	33.40	0.746	0.69(0.28)	0.41	21.8	205.00
2	6.04	21.73	0.987	0.68(0.55)	0.81	14.4	207.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 11.89 Tc(MIN.) = 33.40
 EFFECTIVE AREA(ACRES) = 36.20 AREA-AVERAGED Fm(INCH/HR) = 0.39
 AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.57
 TOTAL AREA(ACRES) = 36.2
 LONGEST FLOWPATH FROM NODE 205.00 TO NODE 209.00 = 2280.00 FEET.

 FLOW PROCESS FROM NODE 209.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

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UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 350.00
 STREET LENGTH(FEET) = 1281.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.85

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.48
 HALFSTREET FLOOD WIDTH(FEET) = 17.70
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.48
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.19
 STREET FLOW TRAVEL TIME(MIN.) = 8.60 Tc(MIN.) = 41.99
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.643

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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AGRICULTURAL GOOD COVER					
"ORCHARDS"	B	1.87	0.72	1.000	58
AGRICULTURAL GOOD COVER					
"ORCHARDS"	C	3.90	0.52	1.000	72
COMMERCIAL	B	6.81	0.69	0.100	61
COMMERCIAL	C	0.96	0.49	0.100	74
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.44	0.69	0.600	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.17	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.63

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.506

SUBAREA AREA(ACRES) = 20.15 SUBAREA RUNOFF(CFS) = 5.91

EFFECTIVE AREA(ACRES) = 56.35 AREA-AVERAGED Fm(INCH/HR) = 0.36

AREA-AVERAGED Fp(INCH/HR) = 0.66 AREA-AVERAGED Ap = 0.55

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 56.3 PEAK FLOW RATE(CFS) = 14.83

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.70
 FLOW VELOCITY(FEET/SEC.) = 2.48 DEPTH*VELOCITY(FT*FT/SEC.) = 1.19
 LONGEST FLOWPATH FROM NODE 205.00 TO NODE 215.00 = 3561.00 FEET.

 FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 361.00 DOWNSTREAM(FEET) = 359.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.687

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.128

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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COMMERCIAL B 2.35 0.69 0.100 61 17.69
RESIDENTIAL
"5-8 DWELLINGS/ACRE" B 3.98 0.69 0.500 61 22.63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352
SUBAREA RUNOFF(CFS) = 5.05
TOTAL AREA(ACRES) = 6.33 PEAK FLOW RATE(CFS) = 5.05

FLOW PROCESS FROM NODE 211.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 359.50 DOWNSTREAM ELEVATION(FEET) = 357.00
STREET LENGTH(FEET) = 813.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.93
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.27
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.66
STREET FLOW TRAVEL TIME(MIN.) = 8.91 Tc(MIN.) = 26.59

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.865

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.08	0.69	0.100	61

RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 4.74 0.69 0.500 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378
SUBAREA AREA(ACRES) = 6.82 SUBAREA RUNOFF(CFS) = 3.72
EFFECTIVE AREA(ACRES) = 13.15 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 13.1 PEAK FLOW RATE(CFS) = 7.28

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.59
FLOW VELOCITY(FEET/SEC.) = 1.54 DEPTH*VELOCITY(FT*FT/SEC.) = 0.68
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1813.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 26.59
RAINFALL INTENSITY(INCH/HR) = 0.87
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.37
EFFECTIVE STREAM AREA(ACRES) = 13.15
TOTAL STREAM AREA(ACRES) = 13.15
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.28

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 359.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 19.181
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.070
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	3.33	0.69	0.100	61	19.18
RESIDENTIAL "5-8 DWELLINGS/ACRE"	B	6.12	0.69	0.500	61	24.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.359
SUBAREA RUNOFF(CFS) = 7.01
TOTAL AREA(ACRES) = 9.45 PEAK FLOW RATE(CFS) = 7.01

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 357.00
STREET LENGTH(FEET) = 673.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.89
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.47
HALFSTREET FLOOD WIDTH(FEET) = 17.07
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.59

PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.74
 STREET FLOW TRAVEL TIME (MIN.) = 7.05 Tc (MIN.) = 26.24
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.873
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 2.07 0.69 0.100 61
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 4.73 0.69 0.500 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378
 SUBAREA AREA (ACRES) = 6.80 SUBAREA RUNOFF (CFS) = 3.76
 EFFECTIVE AREA (ACRES) = 16.25 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 16.2 PEAK FLOW RATE (CFS) = 9.09

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 17.23
 FLOW VELOCITY (FEET/SEC.) = 1.60 DEPTH*VELOCITY (FT*FT/SEC.) = 0.75
 LONGEST FLOWPATH FROM NODE 212.00 TO NODE 214.00 = 1673.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 26.24
 RAINFALL INTENSITY (INCH/HR) = 0.87
 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA (ACRES) = 16.25
 TOTAL STREAM AREA (ACRES) = 16.25
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 9.09

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.28	26.59	0.865	0.69 (0.25)	0.37	13.1	210.00
2	9.09	26.24	0.873	0.69 (0.25)	0.37	16.2	212.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 16.32 Tc (MIN.) = 26.24
 EFFECTIVE AREA (ACRES) = 29.15 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 29.4
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1813.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

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UPSTREAM ELEVATION (FEET) = 357.00 DOWNSTREAM ELEVATION (FEET) = 355.00

STREET LENGTH (FEET) = 1310.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.94
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.62
 HALFSTREET FLOOD WIDTH (FEET) = 20.00
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.65
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.02
 STREET FLOW TRAVEL TIME (MIN.) = 13.22 Tc (MIN.) = 39.45
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.670
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.88 0.69 0.100 61
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 10.31 0.69 0.500 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.391
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA (ACRES) = 14.19 SUBAREA RUNOFF (CFS) = 5.21
 EFFECTIVE AREA (ACRES) = 43.34 AREA-AVERAGED Fm (INCH/HR) = 0.26
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA (ACRES) = 43.6 PEAK FLOW RATE (CFS) = 16.35

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.59 HALFSTREET FLOOD WIDTH (FEET) = 20.00
 FLOW VELOCITY (FEET/SEC.) = 1.55 DEPTH*VELOCITY (FT*FT/SEC.) = 0.92
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3123.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
 =====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	16.35	39.45	0.670	0.69 (0.26)	0.37	43.3	210.00

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3123.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1 14.83 41.99 0.643 0.66(0.36) 0.55 56.3 205.00
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 215.00 = 3561.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 30.73 Tc(MIN.) = 39.451
EFFECTIVE AREA(ACRES) = 93.26 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.67 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 99.9
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 215.00 = 3561.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<<
=====

FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<
=====

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 352.50
STREET LENGTH(FEET) = 714.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.71

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.64
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.60
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.65

STREET FLOW TRAVEL TIME(MIN.) = 4.58 Tc(MIN.) = 44.03

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.624

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.89	0.69	0.100	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.61	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 1.97

EFFECTIVE AREA(ACRES) = 98.76 AREA-AVERAGED Fm(INCH/HR) = 0.31

AREA-AVERAGED Fp(INCH/HR) = 0.67 AREA-AVERAGED Ap = 0.46

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 105.4 PEAK FLOW RATE(CFS) = 30.73

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.63 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.57 DEPTH*VELOCITY(FT*FT/SEC.) = 1.62
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 216.00 = 4275.00 FEET.

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	30.73	44.03	0.624	0.67(0.31)	0.46	98.8	205.00

LONGEST FLOWPATH FROM NODE 205.00 TO NODE 216.00 = 4275.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	27.47	57.12	0.527	0.69(0.12)	0.17	66.6	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 216.00 = 5558.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 55.05 Tc(MIN.) = 44.027
EFFECTIVE AREA(ACRES) = 146.42 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.67 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 172.1
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 216.00 = 5558.00 FEET.

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<
=====

FLOW PROCESS FROM NODE 216.00 TO NODE 227.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 352.50 DOWNSTREAM(FEET) = 350.00

FLOW LENGTH(FEET) = 825.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 6.44

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 55.05

PIPE TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 46.16

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 227.00 = 6383.00 FEET.

FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 359.00 DOWNSTREAM (FEET) = 355.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.537
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	5.00	0.69	0.100	61	14.54
RESIDENTIAL						
"5-8 DWELLINGS/ACRE"	B	0.31	0.69	0.500	61	18.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.123
SUBAREA RUNOFF (CFS) = 5.72
TOTAL AREA (ACRES) = 5.31 PEAK FLOW RATE (CFS) = 5.72

FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 355.00 DOWNSTREAM ELEVATION (FEET) = 353.00
STREET LENGTH (FEET) = 1253.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.91
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.49
HALFSTREET FLOOD WIDTH (FEET) = 18.48
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.22
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.60
STREET FLOW TRAVEL TIME (MIN.) = 17.13 Tc (MIN.) = 31.67
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.773

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.09	0.69	0.100	61
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" B 7.34 0.69 0.500 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.411
SUBAREA AREA (ACRES) = 9.43 SUBAREA RUNOFF (CFS) = 4.16
EFFECTIVE AREA (ACRES) = 14.74 AREA-AVERAGED Fm (INCH/HR) = 0.21
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.31
TOTAL AREA (ACRES) = 14.7 PEAK FLOW RATE (CFS) = 7.45

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.49 HALFSTREET FLOOD WIDTH (FEET) = 18.09
FLOW VELOCITY (FEET/SEC.) = 1.20 DEPTH*VELOCITY (FT*FT/SEC.) = 0.58
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 222.00 = 2253.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 353.00 DOWNSTREAM ELEVATION (FEET) = 350.50
STREET LENGTH (FEET) = 668.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.60
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.45
HALFSTREET FLOOD WIDTH (FEET) = 16.05
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.72
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME (MIN.) = 6.46 Tc (MIN.) = 38.13
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.685
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.28 0.69 0.100 61
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.04 0.69 0.400 61
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 3.92 0.69 0.500 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.401
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA (ACRES) = 6.24 SUBAREA RUNOFF (CFS) = 2.30
EFFECTIVE AREA (ACRES) = 20.98 AREA-AVERAGED Fm (INCH/HR) = 0.23
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.34
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA (ACRES) = 21.0 PEAK FLOW RATE (CFS) = 8.59

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 16.05
 FLOW VELOCITY(FEET/SEC.) = 1.72 DEPTH*VELOCITY(FT*FT/SEC.) = 0.77
 LONGEST FLOWPATH FROM NODE 220.00 TO NODE 223.00 = 2921.00 FEET.

 FLOW PROCESS FROM NODE 223.00 TO NODE 227.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 350.50 DOWNSTREAM ELEVATION(FEET) = 350.00
 STREET LENGTH(FEET) = 508.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.93
 STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.12
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.62
 STREET FLOW TRAVEL TIME(MIN.) = 7.57 Tc(MIN.) = 45.70

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.609

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.63	0.69	0.100	61
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.92	0.69	0.400	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.66	0.69	0.600	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.35	0.69	0.500	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.432

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 8.56 SUBAREA RUNOFF(CFS) = 2.66

EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 10.30

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.14 DEPTH*VELOCITY(FT*FT/SEC.) = 0.63

LONGEST FLOWPATH FROM NODE 220.00 TO NODE 227.00 = 3429.00 FEET.

FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
 =====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	10.30	45.70	0.609	0.69(0.25)	0.36	29.5	220.00

LONGEST FLOWPATH FROM NODE 220.00 TO NODE 227.00 = 3429.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	55.05	46.16	0.605	0.67(0.25)	0.37	146.4	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 227.00 = 6383.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 65.24 Tc(MIN.) = 46.161
 EFFECTIVE AREA(ACRES) = 175.96 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 201.6
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 227.00 = 6383.00 FEET.

FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
 =====

FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 46.16

RAINFALL INTENSITY(INCH/HR) = 0.60

AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.68

AREA-AVERAGED Ap = 0.37

EFFECTIVE STREAM AREA(ACRES) = 175.96

TOTAL STREAM AREA(ACRES) = 201.61

PEAK FLOW RATE(CFS) AT CONFLUENCE = 65.24

FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00

ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 355.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.902
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.319
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	4.94	0.69	0.100	61	13.90
COMMERCIAL	B	2.04	0.69	0.100	61	13.90
RESIDENTIAL "5-8 DWELLINGS/ACRE"	B	2.91	0.69	0.500	61	17.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218
 SUBAREA RUNOFF(CFS) = 10.41
 TOTAL AREA(ACRES) = 9.89 PEAK FLOW RATE(CFS) = 10.41

FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 354.50
 STREET LENGTH(FEET) = 912.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.66
 STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.67
 HALFSTREET FLOOD WIDTH(FEET) = 20.01
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.09

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.73
 STREET FLOW TRAVEL TIME(MIN.) = 13.91 Tc(MIN.) = 27.81

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.841

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.74	0.69	0.100	61
COMMERCIAL	B	5.59	0.69	0.100	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	5.48	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.259
 SUBAREA AREA(ACRES) = 13.81 SUBAREA RUNOFF(CFS) = 8.24
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.24
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 14.40

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.08 DEPTH*VELOCITY(FT*FT/SEC.) = 0.72
 LONGEST FLOWPATH FROM NODE 224.00 TO NODE 226.00 = 1912.00 FEET.

FLOW PROCESS FROM NODE 226.00 TO NODE 227.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 354.50 DOWNSTREAM ELEVATION(FEET) = 350.00
 STREET LENGTH(FEET) = 1336.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.91

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.56
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.10
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.17

STREET FLOW TRAVEL TIME(MIN.) = 10.62 Tc(MIN.) = 38.43

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.681

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.78	0.69	0.100	61
COMMERCIAL	B	1.55	0.69	0.100	61
COMMERCIAL	B	8.33	0.69	0.100	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	6.56	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.237

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 19.22 SUBAREA RUNOFF(CFS) = 9.00

EFFECTIVE AREA(ACRES) = 42.92 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.24

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 42.9 PEAK FLOW RATE(CFS) = 20.02

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 2.14 DEPTH*VELOCITY(FT*FT/SEC.) = 1.21

LONGEST FLOWPATH FROM NODE 224.00 TO NODE 227.00 = 3248.00 FEET.

FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 38.43
RAINFALL INTENSITY (INCH/HR) = 0.68
AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.24
EFFECTIVE STREAM AREA (ACRES) = 42.92
TOTAL STREAM AREA (ACRES) = 42.92
PEAK FLOW RATE (CFS) AT CONFLUENCE = 20.02

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	65.24	46.16	0.605	0.68 (0.25)	0.37	176.0	200.00
2	20.02	38.43	0.681	0.69 (0.16)	0.24	42.9	224.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 82.29 Tc (MIN.) = 46.16
EFFECTIVE AREA (ACRES) = 218.88 AREA-AVERAGED Fm (INCH/HR) = 0.23
AREA-AVERAGED Fp (INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 244.5
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 227.00 = 6383.00 FEET.

FLOW PROCESS FROM NODE 227.00 TO NODE 236.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 498.00 CHANNEL SLOPE = 0.0201
CHANNEL BASE (FEET) = 3.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 3.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.599

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.93	0.69	0.100	61
COMMERCIAL	B	3.09	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 83.51

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.09

AVERAGE FLOW DEPTH (FEET) = 1.25 TRAVEL TIME (MIN.) = 0.69

Tc (MIN.) = 46.85

SUBAREA AREA (ACRES) = 5.02 SUBAREA RUNOFF (CFS) = 2.44

EFFECTIVE AREA (ACRES) = 223.90 AREA-AVERAGED Fm (INCH/HR) = 0.23

AREA-AVERAGED Fp (INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.34

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 249.6 PEAK FLOW RATE (CFS) = 82.29

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.24 FLOW VELOCITY (FEET/SEC.) = 12.10
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<
=====

FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 352.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.397

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.235

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.51	0.69	0.100	61	15.40
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	1.30	0.69	0.400	61	18.94
SCHOOL	B	4.92	0.69	0.600	61	20.87

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.523

SUBAREA RUNOFF (CFS) = 5.30

TOTAL AREA (ACRES) = 6.73 PEAK FLOW RATE (CFS) = 5.30

FLOW PROCESS FROM NODE 231.00 TO NODE 233.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====

UPSTREAM ELEVATION (FEET) = 352.00 DOWNSTREAM ELEVATION (FEET) = 350.00
STREET LENGTH (FEET) = 575.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.55

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.45

HALFSTREET FLOOD WIDTH (FEET) = 16.29
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.67
 PRODUCT OF DEPTH & VELOCITY (FT*FT/SEC.) = 0.76
 STREET FLOW TRAVEL TIME (MIN.) = 5.74 Tc (MIN.) = 21.14
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.005
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 1.21 0.69 0.100 61
 PUBLIC PARK B 4.03 0.69 0.850 61
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.71 0.69 0.400 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.33 0.69 0.600 61
 SCHOOL B 5.04 0.69 0.600 61
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.621
 SUBAREA AREA (ACRES) = 12.32 SUBAREA RUNOFF (CFS) = 6.42
 EFFECTIVE AREA (ACRES) = 19.05 AREA-AVERAGED Fm (INCH/HR) = 0.40
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.59
 TOTAL AREA (ACRES) = 19.0 PEAK FLOW RATE (CFS) = 10.33

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.62
 FLOW VELOCITY (FEET/SEC.) = 1.74 DEPTH*VELOCITY (FT*FT/SEC.) = 0.83
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1575.00 FEET.

 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 21.14
 RAINFALL INTENSITY (INCH/HR) = 1.00
 AREA-AVERAGED Fm (INCH/HR) = 0.40
 AREA-AVERAGED Fp (INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.59
 EFFECTIVE STREAM AREA (ACRES) = 19.05
 TOTAL STREAM AREA (ACRES) = 19.05
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 10.33

 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 841.00
 ELEVATION DATA: UPSTREAM (FEET) = 351.00 DOWNSTREAM (FEET) = 350.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.288
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.145
 SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

COMMERCIAL B 0.86 0.69 0.100 61 17.29
 PUBLIC PARK B 5.87 0.69 0.850 61 27.47
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" B 1.76 0.69 0.600 61 23.43
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.722
 SUBAREA RUNOFF (CFS) = 4.96
 TOTAL AREA (ACRES) = 8.49 PEAK FLOW RATE (CFS) = 4.96

 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.29
 RAINFALL INTENSITY (INCH/HR) = 1.15
 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.72
 EFFECTIVE STREAM AREA (ACRES) = 8.49
 TOTAL STREAM AREA (ACRES) = 8.49
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 4.96

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.33	21.14	1.005	0.69 (0.40)	0.59	19.0	230.00
2	4.96	17.29	1.145	0.69 (0.50)	0.72	8.5	232.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 14.22 Tc (MIN.) = 21.14
 EFFECTIVE AREA (ACRES) = 27.54 AREA-AVERAGED Fm (INCH/HR) = 0.43
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.63
 TOTAL AREA (ACRES) = 27.5
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1575.00 FEET.

 FLOW PROCESS FROM NODE 233.00 TO NODE 236.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 350.00 DOWNSTREAM ELEVATION (FEET) = 340.00
 STREET LENGTH (FEET) = 871.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.31
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.47
HALFSTREET FLOOD WIDTH(FEET) = 16.99
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.12
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.45
STREET FLOW TRAVEL TIME(MIN.) = 4.65 Tc(MIN.) = 25.79
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.883
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.23 0.69 0.100 61
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.78 0.69 0.400 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 7.38 0.69 0.600 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.62 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.453
SUBAREA AREA(ACRES) = 12.01 SUBAREA RUNOFF(CFS) = 6.19
EFFECTIVE AREA(ACRES) = 39.55 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 17.39

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 17.07
FLOW VELOCITY(FEET/SEC.) = 3.11 DEPTH*VELOCITY(FT*FT/SEC.) = 1.45
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 2446.00 FEET.

*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 11
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 17.39 25.79 0.883 0.69( 0.39) 0.58 39.5 230.00
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 2446.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 82.29 46.85 0.599 0.68( 0.23) 0.34 223.9 200.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 89.57 Tc(MIN.) = 46.848
EFFECTIVE AREA(ACRES) = 263.45 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 289.1
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1<<<<
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*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<
=====
*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 895.00
ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 345.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.969
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.315
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 2.28 0.69 0.100 61 13.97
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 4.15 0.69 0.600 61 18.93
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 3.69 0.69 0.600 61 18.93
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.487
SUBAREA RUNOFF(CFS) = 8.93
TOTAL AREA(ACRES) = 10.12 PEAK FLOW RATE(CFS) = 8.93

*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 377.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.18
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.93
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 14.84
LONGEST FLOWPATH FROM NODE 234.00 TO NODE 236.00 = 1272.00 FEET.

*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.84
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.264
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 13.25 0.69 0.100 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 13.25 SUBAREA RUNOFF(CFS) = 14.26
 EFFECTIVE AREA(ACRES) = 23.37 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.27
 TOTAL AREA(ACRES) = 23.4 PEAK FLOW RATE(CFS) = 22.73

 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<
 =====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	22.73	14.84	1.264	0.69(0.18)	0.27	23.4	234.00

LONGEST FLOWPATH FROM NODE 234.00 TO NODE 236.00 = 1272.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	89.57	46.85	0.599	0.68(0.25)	0.37	263.4	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 98.31 Tc(MIN.) = 46.848
 EFFECTIVE AREA(ACRES) = 286.82 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 312.5
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<
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| END OF SYSTEM "J" |
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 FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 349.00 DOWNSTREAM(FEET) = 345.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.537
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.282

SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 1.33 0.69 0.100 61 14.54
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" B 8.00 0.69 0.600 61 19.70
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.529
 SUBAREA RUNOFF(CFS) = 7.72
 TOTAL AREA(ACRES) = 9.33 PEAK FLOW RATE(CFS) = 7.72

 FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 345.00 DOWNSTREAM ELEVATION(FEET) = 344.50
 STREET LENGTH(FEET) = 997.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.41

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.61
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.93
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.57
 STREET FLOW TRAVEL TIME(MIN.) = 17.91 Tc(MIN.) = 32.44

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.761

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.69	0.100	61	
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	14.22	0.69	0.600	61	

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.573
 SUBAREA AREA(ACRES) = 15.02 SUBAREA RUNOFF(CFS) = 4.96
 EFFECTIVE AREA(ACRES) = 24.35 AREA-AVERAGED Fm(INCH/HR) = 0.38
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.56
 TOTAL AREA(ACRES) = 24.4 PEAK FLOW RATE(CFS) = 8.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 0.85 DEPTH*VELOCITY(FT*FT/SEC.) = 0.49
 LONGEST FLOWPATH FROM NODE 240.00 TO NODE 242.00 = 1997.00 FEET.

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 344.50 DOWNSTREAM ELEVATION(FEET) = 344.00
STREET LENGTH(FEET) = 943.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.50

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.62

HALFSTREET FLOOD WIDTH(FEET) = 20.00

AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.98

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.61

STREET FLOW TRAVEL TIME(MIN.) = 15.99 Tc(MIN.) = 48.44

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.586

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.71	0.69	0.100	61
COMMERCIAL	B	2.54	0.69	0.100	61
COMMERCIAL	B	3.84	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	12.05	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.399

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 20.14 SUBAREA RUNOFF(CFS) = 6.38

EFFECTIVE AREA(ACRES) = 44.49 AREA-AVERAGED Fm(INCH/HR) = 0.33

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 44.5 PEAK FLOW RATE(CFS) = 12.08

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.63 HALFSTREET FLOOD WIDTH(FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 1.00 DEPTH*VELOCITY(FT*FT/SEC.) = 0.63

LONGEST FLOWPATH FROM NODE 240.00 TO NODE 243.00 = 2940.00 FEET.

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| END OF SYSTEM "K" |
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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 44.5 TC(MIN.) = 48.44
EFFECTIVE AREA(ACRES) = 44.49 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.485
PEAK FLOW RATE(CFS) = 12.08

-----+
END OF RATIONAL METHOD ANALYSIS
-----+
=====

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.518
SUBAREA AREA(ACRES) = 13.33 SUBAREA RUNOFF(CFS) = 10.39
EFFECTIVE AREA(ACRES) = 20.99 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 21.0 PEAK FLOW RATE(CFS) = 16.57

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.52 DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 1724.00 FEET.

FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 363.00 DOWNSTREAM ELEVATION(FEET) = 362.50
STREET LENGTH(FEET) = 1265.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.77

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.80
HALFSTREET FLOOD WIDTH(FEET) = 26.54
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.12
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.89
STREET FLOW TRAVEL TIME(MIN.) = 18.88 Tc(MIN.) = 46.63
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.872

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.23	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.92	0.69	0.600	61
COMMERCIAL	B	7.46	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.194
SUBAREA AREA(ACRES) = 15.61 SUBAREA RUNOFF(CFS) = 10.38
EFFECTIVE AREA(ACRES) = 36.60 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 36.6 PEAK FLOW RATE(CFS) = 20.34

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.78 HALFSTREET FLOOD WIDTH(FEET) = 25.62
FLOW VELOCITY(FEET/SEC.) = 1.10 DEPTH*VELOCITY(FT*FT/SEC.) = 0.85

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,

AND L = 1265.0 FT WITH ELEVATION-DROP = 0.5 FT, IS 16.3 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 4.00
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 2989.00 FEET.

FLOW PROCESS FROM NODE 4.00 TO NODE 9.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 362.50 DOWNSTREAM ELEVATION(FEET) = 362.00
STREET LENGTH(FEET) = 525.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.41

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.69
HALFSTREET FLOOD WIDTH(FEET) = 21.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.50
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.03
STREET FLOW TRAVEL TIME(MIN.) = 5.83 Tc(MIN.) = 52.46
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.808

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.08	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.99	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.493
SUBAREA AREA(ACRES) = 5.07 SUBAREA RUNOFF(CFS) = 2.14
EFFECTIVE AREA(ACRES) = 41.67 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 41.7 PEAK FLOW RATE(CFS) = 20.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 HALFSTREET FLOOD WIDTH(FEET) = 20.56
FLOW VELOCITY(FEET/SEC.) = 1.47 DEPTH*VELOCITY(FT*FT/SEC.) = 1.00
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 9.00 = 3514.00 FEET.

FLOW PROCESS FROM NODE 9.00 TO NODE 9.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 5.00 TO NODE 6.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 367.50 DOWNSTREAM(FEET) = 364.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.397

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.791

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.28	0.69	0.100	61	15.40

RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 4.84 0.69 0.600 61 20.87

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.495

SUBAREA RUNOFF(CFS) = 7.99

TOTAL AREA(ACRES) = 6.12 PEAK FLOW RATE(CFS) = 7.99

FLOW PROCESS FROM NODE 6.00 TO NODE 8.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 364.50 DOWNSTREAM ELEVATION(FEET) = 362.50
STREET LENGTH(FEET) = 791.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.41
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 18.79
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.55
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME(MIN.) = 8.48 Tc(MIN.) = 23.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.347

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.34	0.69	0.100	61

RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 3.86 0.69 0.600 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.471

SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 4.79

EFFECTIVE AREA(ACRES) = 11.32 AREA-AVERAGED Fm(INCH/HR) = 0.33

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 10.34

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 18.79
FLOW VELOCITY(FEET/SEC.) = 1.54 DEPTH*VELOCITY(FT*FT/SEC.) = 0.77
LONGEST FLOWPATH FROM NODE 5.00 TO NODE 8.00 = 1791.00 FEET.

FLOW PROCESS FROM NODE 8.00 TO NODE 8.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 23.88
RAINFALL INTENSITY(INCH/HR) = 1.35
AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.48
EFFECTIVE STREAM AREA(ACRES) = 11.32
TOTAL STREAM AREA(ACRES) = 11.32
PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.34

FLOW PROCESS FROM NODE 7.00 TO NODE 8.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 653.00
ELEVATION DATA: UPSTREAM(FEET) = 364.00 DOWNSTREAM(FEET) = 362.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.696

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.933

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.12	0.69	0.100	61	13.70

RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 3.87 0.69 0.600 61 18.56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488

SUBAREA RUNOFF(CFS) = 7.18

TOTAL AREA(ACRES) = 4.99 PEAK FLOW RATE(CFS) = 7.18

FLOW PROCESS FROM NODE 8.00 TO NODE 8.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.70
RAINFALL INTENSITY(INCH/HR) = 1.93
AREA-AVERAGED Fm(INCH/HR) = 0.33

AREA-AVERAGED Fp (INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.49
 EFFECTIVE STREAM AREA (ACRES) = 4.99
 TOTAL STREAM AREA (ACRES) = 4.99
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 7.18

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.34	23.88	1.347	0.69 (0.33)	0.48	11.3	5.00
2	7.18	13.70	1.933	0.69 (0.33)	0.49	5.0	7.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 14.88 Tc (MIN.) = 23.88
 EFFECTIVE AREA (ACRES) = 16.31 AREA-AVERAGED Fm (INCH/HR) = 0.33
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
 TOTAL AREA (ACRES) = 16.3
 LONGEST FLOWPATH FROM NODE 5.00 TO NODE 8.00 = 1791.00 FEET.

 FLOW PROCESS FROM NODE 8.00 TO NODE 9.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 362.50 DOWNSTREAM (FEET) = 362.00
 FLOW LENGTH (FEET) = 495.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.05
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 14.88
 PIPE TRAVEL TIME (MIN.) = 2.70 Tc (MIN.) = 26.58
 LONGEST FLOWPATH FROM NODE 5.00 TO NODE 9.00 = 2286.00 FEET.

 FLOW PROCESS FROM NODE 9.00 TO NODE 9.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 26.58
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.256
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.24	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	3.42	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.467
 SUBAREA AREA (ACRES) = 4.66 SUBAREA RUNOFF (CFS) = 3.93
 EFFECTIVE AREA (ACRES) = 20.97 AREA-AVERAGED Fm (INCH/HR) = 0.33
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 21.0 PEAK FLOW RATE (CFS) = 17.48

 FLOW PROCESS FROM NODE 9.00 TO NODE 9.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

 ** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	17.48	26.58	1.256	0.69 (0.33)	0.48	21.0	5.00

LONGEST FLOWPATH FROM NODE 5.00 TO NODE 9.00 = 2286.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	20.36	52.46	0.808	0.69 (0.26)	0.39	41.7	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 9.00 = 3514.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 29.37 Tc (MIN.) = 52.458
 EFFECTIVE AREA (ACRES) = 62.64 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 62.6
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 9.00 = 3514.00 FEET.

 FLOW PROCESS FROM NODE 9.00 TO NODE 9.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

 FLOW PROCESS FROM NODE 9.00 TO NODE 10.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 362.00 DOWNSTREAM (FEET) = 361.50
 FLOW LENGTH (FEET) = 617.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.35
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 29.37
 PIPE TRAVEL TIME (MIN.) = 3.07 Tc (MIN.) = 55.53
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 10.00 = 4131.00 FEET.

 FLOW PROCESS FROM NODE 10.00 TO NODE 10.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 55.53
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.778
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.77	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	5.59	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.480
 SUBAREA AREA (ACRES) = 7.36 SUBAREA RUNOFF (CFS) = 2.97

EFFECTIVE AREA(ACRES) = 70.00 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 70.0 PEAK FLOW RATE(CFS) = 30.70

FLOW PROCESS FROM NODE 10.00 TO NODE 10.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 55.53
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.778
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.91 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 4.14 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.442
SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 2.59
EFFECTIVE AREA(ACRES) = 76.05 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 33.28

FLOW PROCESS FROM NODE 10.00 TO NODE 11.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 361.50 DOWNSTREAM(FEET) = 352.00
FLOW LENGTH(FEET) = 125.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.15
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.28
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 55.64
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 11.00 = 4256.00 FEET.

+-----+
| END OF SYSTEM "A" |
| |
| |
+-----+

FLOW PROCESS FROM NODE 15.00 TO NODE 16.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 362.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.537
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.860
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 2.33 0.69 0.100 61 14.54
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 6.61 0.69 0.600 61 19.70
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.470
SUBAREA RUNOFF(CFS) = 12.37
TOTAL AREA(ACRES) = 8.94 PEAK FLOW RATE(CFS) = 12.37

FLOW PROCESS FROM NODE 16.00 TO NODE 17.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 362.00 DOWNSTREAM ELEVATION(FEET) = 360.00
STREET LENGTH(FEET) = 674.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.48

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.91
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 5.88 Tc(MIN.) = 20.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.491

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 5.77 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.471
SUBAREA AREA(ACRES) = 7.77 SUBAREA RUNOFF(CFS) = 8.17
EFFECTIVE AREA(ACRES) = 16.71 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 17.57

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.96 DEPTH*VELOCITY(FT*FT/SEC.) = 1.09
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 17.00 = 1674.00 FEET.

FLOW PROCESS FROM NODE 17.00 TO NODE 18.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 360.00 DOWNSTREAM ELEVATION(FEET) = 359.50
STREET LENGTH(FEET) = 305.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.84
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.64
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.78
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.14
STREET FLOW TRAVEL TIME(MIN.) = 2.85 Tc(MIN.) = 23.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.370
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.15 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 6.97 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.482
SUBAREA AREA(ACRES) = 9.12 SUBAREA RUNOFF(CFS) = 8.53
EFFECTIVE AREA(ACRES) = 25.83 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 24.27

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.86 DEPTH*VELOCITY(FT*FT/SEC.) = 1.22
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 18.00 = 1979.00 FEET.

FLOW PROCESS FROM NODE 18.00 TO NODE 19.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 359.50 DOWNSTREAM ELEVATION(FEET) = 359.00
STREET LENGTH(FEET) = 306.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.16
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.69
HALFSTREET FLOOD WIDTH(FEET) = 21.11
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.97
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.35
STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 25.86
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.279
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.15 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" A 0.19 0.93 0.600 39
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 6.80 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.482
SUBAREA AREA(ACRES) = 9.14 SUBAREA RUNOFF(CFS) = 7.77
EFFECTIVE AREA(ACRES) = 34.97 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 35.0 PEAK FLOW RATE(CFS) = 29.93

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.70 HALFSTREET FLOOD WIDTH(FEET) = 21.78
FLOW VELOCITY(FEET/SEC.) = 2.01 DEPTH*VELOCITY(FT*FT/SEC.) = 1.41
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 19.00 = 2285.00 FEET.

FLOW PROCESS FROM NODE 19.00 TO NODE 22.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 359.00 DOWNSTREAM(FEET) = 358.50
FLOW LENGTH(FEET) = 164.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.55
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 29.93
PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 26.35
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 22.00 = 2449.00 FEET.

FLOW PROCESS FROM NODE 22.00 TO NODE 22.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.263
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	A	0.22	0.93	0.100	39
COMMERCIAL	B	1.24	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	0.69	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.95	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.73
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.457
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 4.26
EFFECTIVE AREA (ACRES) = 40.07 AREA-AVERAGED Fm (INCH/HR) = 0.33
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
TOTAL AREA (ACRES) = 40.1 PEAK FLOW RATE (CFS) = 33.71

FLOW PROCESS FROM NODE 22.00 TO NODE 22.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 26.35
RAINFALL INTENSITY (INCH/HR) = 1.26
AREA-AVERAGED Fm (INCH/HR) = 0.33
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.47
EFFECTIVE STREAM AREA (ACRES) = 40.07
TOTAL STREAM AREA (ACRES) = 40.07
PEAK FLOW RATE (CFS) AT CONFLUENCE = 33.71

FLOW PROCESS FROM NODE 20.00 TO NODE 21.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 360.00 DOWNSTREAM (FEET) = 359.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 25.995
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.275
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	9.94	0.69	0.600	61	26.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA RUNOFF (CFS) = 7.72
TOTAL AREA (ACRES) = 9.94 PEAK FLOW RATE (CFS) = 7.72

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 359.00 DOWNSTREAM ELEVATION (FEET) = 358.50
STREET LENGTH (FEET) = 1243.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.94

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.64
HALFSTREET FLOOD WIDTH (FEET) = 20.00
AVERAGE FLOW VELOCITY (FEET/SEC.) = 0.89
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.57
STREET FLOW TRAVEL TIME (MIN.) = 23.36 Tc (MIN.) = 49.36
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.840

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	15.85	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA (ACRES) = 15.85 SUBAREA RUNOFF (CFS) = 6.11
EFFECTIVE AREA (ACRES) = 25.79 AREA-AVERAGED Fm (INCH/HR) = 0.41
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.60
TOTAL AREA (ACRES) = 25.8 PEAK FLOW RATE (CFS) = 9.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.62 HALFSTREET FLOOD WIDTH (FEET) = 20.00
FLOW VELOCITY (FEET/SEC.) = 0.85 DEPTH*VELOCITY (FT*FT/SEC.) = 0.53
LONGEST FLOWPATH FROM NODE 20.00 TO NODE 22.00 = 2243.00 FEET.

FLOW PROCESS FROM NODE 22.00 TO NODE 22.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 49.36
RAINFALL INTENSITY (INCH/HR) = 0.84
AREA-AVERAGED Fm (INCH/HR) = 0.41
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.60
EFFECTIVE STREAM AREA (ACRES) = 25.79
TOTAL STREAM AREA (ACRES) = 25.79
PEAK FLOW RATE (CFS) AT CONFLUENCE = 9.95

** CONFLUENCE DATA **

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER

PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.79
 STREET FLOW TRAVEL TIME (MIN.) = 6.47 Tc (MIN.) = 23.17
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.373
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 0.69 0.93 0.100 39
 COMMERCIAL B 1.12 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" A 1.76 0.93 0.600 39
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.90 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.76
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.479
 SUBAREA AREA (ACRES) = 7.47 SUBAREA RUNOFF (CFS) = 6.78
 EFFECTIVE AREA (ACRES) = 12.05 AREA-AVERAGED Fm (INCH/HR) = 0.35
 AREA-AVERAGED Fp (INCH/HR) = 0.74 AREA-AVERAGED Ap = 0.47
 TOTAL AREA (ACRES) = 12.1 PEAK FLOW RATE (CFS) = 11.11

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.93
 FLOW VELOCITY (FEET/SEC.) = 1.81 DEPTH*VELOCITY (FT*FT/SEC.) = 0.87
 LONGEST FLOWPATH FROM NODE 23.00 TO NODE 25.00 = 1676.00 FEET.

 FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 23.17
 RAINFALL INTENSITY (INCH/HR) = 1.37
 AREA-AVERAGED Fm (INCH/HR) = 0.35
 AREA-AVERAGED Fp (INCH/HR) = 0.74
 AREA-AVERAGED Ap = 0.47
 EFFECTIVE STREAM AREA (ACRES) = 12.05
 TOTAL STREAM AREA (ACRES) = 12.05
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 11.11

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	43.89	27.43	1.231	0.69 (0.34)	0.50	55.0	15.00
2	11.11	23.17	1.373	0.74 (0.35)	0.47	12.1	23.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 53.44 Tc (MIN.) = 27.43
 EFFECTIVE AREA (ACRES) = 67.08 AREA-AVERAGED Fm (INCH/HR) = 0.35
 AREA-AVERAGED Fp (INCH/HR) = 0.70 AREA-AVERAGED Ap = 0.49
 TOTAL AREA (ACRES) = 82.9
 LONGEST FLOWPATH FROM NODE 15.00 TO NODE 25.00 = 2893.00 FEET.

 FLOW PROCESS FROM NODE 25.00 TO NODE 26.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 356.50 DOWNSTREAM (FEET) = 347.40
 FLOW LENGTH (FEET) = 44.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 31.44
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 53.44
 PIPE TRAVEL TIME (MIN.) = 0.02 Tc (MIN.) = 27.46
 LONGEST FLOWPATH FROM NODE 15.00 TO NODE 26.00 = 2937.00 FEET.

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 | END OF SYSTEM "B" |
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 FLOW PROCESS FROM NODE 30.00 TO NODE 31.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 364.00 DOWNSTREAM (FEET) = 360.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.537
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.860
 SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 2.25 0.69 0.100 61 14.54
 COMMERCIAL B 6.52 0.69 0.100 61 14.54
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 14.14
 TOTAL AREA (ACRES) = 8.77 PEAK FLOW RATE (CFS) = 14.14

 FLOW PROCESS FROM NODE 31.00 TO NODE 32.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION (FEET) = 360.00 DOWNSTREAM ELEVATION (FEET) = 359.50
 STREET LENGTH (FEET) = 701.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.13
***STREET FLOWING FULL***
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.71
HALFSTREET FLOOD WIDTH(FEET) = 21.96
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.34
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 8.74 Tc(MIN.) = 23.28
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      0.47     0.69     0.100    61
COMMERCIAL            B      9.67     0.69     0.100    61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 10.14 SUBAREA RUNOFF(CFS) = 11.87
EFFECTIVE AREA(ACRES) = 18.91 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 18.9 PEAK FLOW RATE(CFS) = 22.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.73 HALFSTREET FLOOD WIDTH(FEET) = 23.06
FLOW VELOCITY(FEET/SEC.) = 1.38 DEPTH*VELOCITY(FT*FT/SEC.) = 1.00
LONGEST FLOWPATH FROM NODE 30.00 TO NODE 32.00 = 1701.00 FEET.

*****
FLOW PROCESS FROM NODE 32.00 TO NODE 33.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 359.50 DOWNSTREAM(FEET) = 356.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 411.00 CHANNEL SLOPE = 0.0085
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.308
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      1.01     0.69     0.100    61
COMMERCIAL            B      9.10     0.69     0.100    61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.02
AVERAGE FLOW DEPTH(FEET) = 1.42 TRAVEL TIME(MIN.) = 1.70
Tc(MIN.) = 24.98
SUBAREA AREA(ACRES) = 10.11 SUBAREA RUNOFF(CFS) = 11.28
EFFECTIVE AREA(ACRES) = 29.02 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 29.0 PEAK FLOW RATE(CFS) = 32.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.53 FLOW VELOCITY(FEET/SEC.) = 4.19
LONGEST FLOWPATH FROM NODE 30.00 TO NODE 33.00 = 2112.00 FEET.

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| END OF SYSTEM "C1"
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*****
FLOW PROCESS FROM NODE 34.00 TO NODE 35.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 361.00 DOWNSTREAM(FEET) = 359.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.687
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.637
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS  Tc
LAND USE              GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL            B      2.13     0.69     0.100    61  17.69
COMMERCIAL            B      4.45     0.69     0.100    61  17.69
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B      2.79     0.69     0.600    61  23.97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.249
SUBAREA RUNOFF(CFS) = 12.37
TOTAL AREA(ACRES) = 9.37 PEAK FLOW RATE(CFS) = 12.37

*****
FLOW PROCESS FROM NODE 35.00 TO NODE 38.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 359.50 DOWNSTREAM ELEVATION(FEET) = 350.00
STREET LENGTH(FEET) = 505.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.08
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.66
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.79
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.68
STREET FLOW TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 19.91
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.516
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL    B       0.27     0.69      0.100     61
RESIDENTIAL
"3-4 DWELLINGS/ACRE"  B       11.13    0.69      0.600     61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588
SUBAREA AREA(ACRES) = 11.40    SUBAREA RUNOFF(CFS) = 11.41
EFFECTIVE AREA(ACRES) = 20.77    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69    AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 20.8    PEAK FLOW RATE(CFS) = 22.76

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.47    HALFSTREET FLOOD WIDTH(FEET) = 17.23
FLOW VELOCITY(FEET/SEC.) = 4.00    DEPTH*VELOCITY(FT*FT/SEC.) = 1.88
LONGEST FLOWPATH FROM NODE 34.00 TO NODE 38.00 = 1505.00 FEET.

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*****
FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.91
RAINFALL INTENSITY(INCH/HR) = 1.52
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 20.77
TOTAL STREAM AREA(ACRES) = 20.77
PEAK FLOW RATE(CFS) AT CONFLUENCE = 22.76

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*****
FLOW PROCESS FROM NODE 36.00 TO NODE 37.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 360.00    DOWNSTREAM(FEET) = 357.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.397
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.791
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS  Tc
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL        B       1.66    0.69    0.100    61  15.40
COMMERCIAL        B       0.23    0.69    0.100    61  15.40
RESIDENTIAL
"3-5 DWELLINGS/ACRE"  B       5.93    0.69    0.600    61  20.87
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.479
SUBAREA RUNOFF(CFS) = 10.29
TOTAL AREA(ACRES) = 7.82    PEAK FLOW RATE(CFS) = 10.29

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*****
FLOW PROCESS FROM NODE 37.00 TO NODE 38.00 IS CODE = 62

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

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```

UPSTREAM ELEVATION(FEET) = 357.00    DOWNSTREAM ELEVATION(FEET) = 350.00
STREET LENGTH(FEET) = 506.00    CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.18

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STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

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STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 16.68
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.39
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.56
STREET FLOW TRAVEL TIME(MIN.) = 2.49    Tc(MIN.) = 17.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.625

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL        B       0.35    0.69    0.100    61
RESIDENTIAL
"3-4 DWELLINGS/ACRE"  B       13.96    0.69    0.600    61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588
SUBAREA AREA(ACRES) = 14.31    SUBAREA RUNOFF(CFS) = 15.74
EFFECTIVE AREA(ACRES) = 22.13    AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.69    AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 22.1    PEAK FLOW RATE(CFS) = 24.87

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50    HALFSTREET FLOOD WIDTH(FEET) = 19.02
FLOW VELOCITY(FEET/SEC.) = 3.63    DEPTH*VELOCITY(FT*FT/SEC.) = 1.82
LONGEST FLOWPATH FROM NODE 36.00 TO NODE 38.00 = 1506.00 FEET.

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*****
FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

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```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 17.88
RAINFALL INTENSITY(INCH/HR) = 1.63
AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA(ACRES) = 22.13
TOTAL STREAM AREA(ACRES) = 22.13

```

PEAK FLOW RATE(CFS) AT CONFLUENCE = 24.87

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	22.76	19.91	1.516	0.69(0.30)	0.44	20.8	34.00
2	24.87	17.88	1.625	0.69(0.38)	0.55	22.1	36.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 46.47 Tc(MIN.) = 17.88
EFFECTIVE AREA(ACRES) = 40.22 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 42.9
LONGEST FLOWPATH FROM NODE 36.00 TO NODE 38.00 = 1506.00 FEET.

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+-----+
| END OF SYSTEM "C2" |
|                     |
|                     |
+-----+

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FLOW PROCESS FROM NODE 40.00 TO NODE 41.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 361.00 DOWNSTREAM(FEET) = 359.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.698
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.699
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	9.35	0.69	0.600	61	22.63
COMMERCIAL	B	0.73	0.69	0.100	61	16.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.564
SUBAREA RUNOFF(CFS) = 11.91
TOTAL AREA(ACRES) = 10.08 PEAK FLOW RATE(CFS) = 11.91

FLOW PROCESS FROM NODE 41.00 TO NODE 42.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 355.00
STREET LENGTH(FEET) = 992.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.50
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.53
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.09
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.11
STREET FLOW TRAVEL TIME(MIN.) = 7.91 Tc(MIN.) = 24.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.321

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	6.96	0.69	0.600	61
COMMERCIAL	B	3.03	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 9.11
EFFECTIVE AREA(ACRES) = 20.07 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 17.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.15 DEPTH*VELOCITY(FT*FT/SEC.) = 1.15
LONGEST FLOWPATH FROM NODE 40.00 TO NODE 42.00 = 1992.00 FEET.

FLOW PROCESS FROM NODE 42.00 TO NODE 47.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 352.00
STREET LENGTH(FEET) = 1120.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.98
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.57
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.96
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.12

STREET FLOW TRAVEL TIME(MIN.) = 9.54 Tc(MIN.) = 34.15
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.067
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.39	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.61	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 2.79
 EFFECTIVE AREA(ACRES) = 24.07 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
 TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 17.58
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.90 DEPTH*VELOCITY(FT*FT/SEC.) = 1.07
 LONGEST FLOWPATH FROM NODE 40.00 TO NODE 47.00 = 3112.00 FEET.

 FLOW PROCESS FROM NODE 47.00 TO NODE 47.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 34.15
 RAINFALL INTENSITY(INCH/HR) = 1.07
 AREA-AVERAGED Fm(INCH/HR) = 0.34
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.49
 EFFECTIVE STREAM AREA(ACRES) = 24.07
 TOTAL STREAM AREA(ACRES) = 24.07
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.58

 FLOW PROCESS FROM NODE 43.00 TO NODE 44.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 357.00 DOWNSTREAM(FEET) = 354.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.969
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.749
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	2.75	0.69	0.100	61	15.97
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	5.18	0.69	0.600	61	21.64

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.427
 SUBAREA RUNOFF(CFS) = 10.40

TOTAL AREA(ACRES) = 7.93 PEAK FLOW RATE(CFS) = 10.40

FLOW PROCESS FROM NODE 44.00 TO NODE 45.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 354.50 DOWNSTREAM ELEVATION(FEET) = 353.50
 STREET LENGTH(FEET) = 374.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.57

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.53
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.71
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.91
 STREET FLOW TRAVEL TIME(MIN.) = 3.65 Tc(MIN.) = 19.62
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.530

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.49	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	4.33	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.472
 SUBAREA AREA(ACRES) = 5.82 SUBAREA RUNOFF(CFS) = 6.32
 EFFECTIVE AREA(ACRES) = 13.75 AREA-AVERAGED Fm(INCH/HR) = 0.31
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 15.15

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.79 DEPTH*VELOCITY(FT*FT/SEC.) = 0.97
 LONGEST FLOWPATH FROM NODE 43.00 TO NODE 45.00 = 1374.00 FEET.

 FLOW PROCESS FROM NODE 45.00 TO NODE 46.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 353.50 DOWNSTREAM(FEET) = 353.00
 FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.80

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 15.15
 PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 20.85
 LONGEST FLOWPATH FROM NODE 43.00 TO NODE 46.00 = 1654.00 FEET.

 FLOW PROCESS FROM NODE 46.00 TO NODE 46.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.85
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.471
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 1.15 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" A 0.07 0.93 0.600 39
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.24 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.471
 SUBAREA AREA(ACRES) = 4.46 SUBAREA RUNOFF(CFS) = 4.60
 EFFECTIVE AREA(ACRES) = 18.21 AREA-AVERAGED Fm(INCH/HR) = 0.31
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 19.02

 FLOW PROCESS FROM NODE 46.00 TO NODE 47.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 352.00
 FLOW LENGTH(FEET) = 488.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.28
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 19.02
 PIPE TRAVEL TIME(MIN.) = 1.90 Tc(MIN.) = 22.75
 LONGEST FLOWPATH FROM NODE 43.00 TO NODE 47.00 = 2142.00 FEET.

 FLOW PROCESS FROM NODE 47.00 TO NODE 47.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 0.01 0.93 0.100 39
 COMMERCIAL B 0.92 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" A 0.79 0.93 0.600 39
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.77 0.69 0.600 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.76
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.467
 SUBAREA AREA(ACRES) = 3.49 SUBAREA RUNOFF(CFS) = 3.26
 EFFECTIVE AREA(ACRES) = 21.70 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.70 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 21.7 PEAK FLOW RATE(CFS) = 20.95

 FLOW PROCESS FROM NODE 47.00 TO NODE 47.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 22.75
 RAINFALL INTENSITY(INCH/HR) = 1.39
 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.70
 AREA-AVERAGED Ap = 0.45
 EFFECTIVE STREAM AREA(ACRES) = 21.70
 TOTAL STREAM AREA(ACRES) = 21.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 20.95

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	17.58	34.15	1.067	0.69(0.34)	0.49	24.1	40.00
2	20.95	22.75	1.390	0.70(0.32)	0.45	21.7	43.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 35.59 Tc(MIN.) = 22.75
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
 TOTAL AREA(ACRES) = 45.8
 LONGEST FLOWPATH FROM NODE 40.00 TO NODE 47.00 = 3112.00 FEET.

 FLOW PROCESS FROM NODE 47.00 TO NODE 50.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 352.00 DOWNSTREAM(FEET) = 349.50
 FLOW LENGTH(FEET) = 915.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.56
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 35.59
 PIPE TRAVEL TIME(MIN.) = 2.74 Tc(MIN.) = 25.49
 LONGEST FLOWPATH FROM NODE 40.00 TO NODE 50.00 = 4027.00 FEET.

 FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.49

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.291
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 0.62 0.93 0.100 39
 COMMERCIAL B 2.42 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" A 2.12 0.93 0.600 39
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 5.56 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.458
 SUBAREA AREA (ACRES) = 10.72 SUBAREA RUNOFF (CFS) = 9.13
 EFFECTIVE AREA (ACRES) = 46.32 AREA-AVERAGED Fm (INCH/HR) = 0.33
 AREA-AVERAGED Fp (INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.47
 TOTAL AREA (ACRES) = 56.5 PEAK FLOW RATE (CFS) = 40.06

 FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 25.49
 RAINFALL INTENSITY (INCH/HR) = 1.29
 AREA-AVERAGED Fm (INCH/HR) = 0.33
 AREA-AVERAGED Fp (INCH/HR) = 0.71
 AREA-AVERAGED Ap = 0.47
 EFFECTIVE STREAM AREA (ACRES) = 46.32
 TOTAL STREAM AREA (ACRES) = 56.49
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 40.06

 FLOW PROCESS FROM NODE 48.00 TO NODE 49.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 868.00
 ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 353.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.338
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.796
 SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 1.04 0.69 0.100 61 15.34
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" B 2.40 0.69 0.600 61 20.79
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.449
 SUBAREA RUNOFF (CFS) = 4.61
 TOTAL AREA (ACRES) = 3.44 PEAK FLOW RATE (CFS) = 4.61

 FLOW PROCESS FROM NODE 49.00 TO NODE 50.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 349.50
 FLOW LENGTH (FEET) = 1156.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.48
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 4.61
 PIPE TRAVEL TIME (MIN.) = 5.54 Tc (MIN.) = 20.88
 LONGEST FLOWPATH FROM NODE 48.00 TO NODE 50.00 = 2024.00 FEET.

 FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 20.88
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.470
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 0.07 0.93 0.100 39
 COMMERCIAL B 1.64 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" A 0.06 0.93 0.600 39
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 4.19 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.457
 SUBAREA AREA (ACRES) = 5.96 SUBAREA RUNOFF (CFS) = 6.19
 EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.31
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 9.79

 FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 20.88
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.470
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL A 0.56 0.93 0.100 39
 COMMERCIAL B 0.99 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" A 1.07 0.93 0.600 39
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 2.37 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.76
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.445
 SUBAREA AREA (ACRES) = 4.99 SUBAREA RUNOFF (CFS) = 5.08
 EFFECTIVE AREA (ACRES) = 14.39 AREA-AVERAGED Fm (INCH/HR) = 0.32
 AREA-AVERAGED Fp (INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.45
 TOTAL AREA (ACRES) = 14.4 PEAK FLOW RATE (CFS) = 14.87

FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 20.88
RAINFALL INTENSITY(INCH/HR) = 1.47
AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.71
AREA-AVERAGED Ap = 0.45
EFFECTIVE STREAM AREA(ACRES) = 14.39
TOTAL STREAM AREA(ACRES) = 14.39
PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.87

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 2 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 52.61 Tc(MIN.) = 25.49
EFFECTIVE AREA(ACRES) = 60.71 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 70.9
LONGEST FLOWPATH FROM NODE 40.00 TO NODE 50.00 = 4027.00 FEET.

FLOW PROCESS FROM NODE 50.00 TO NODE 51.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 349.50 DOWNSTREAM(FEET) = 344.00
FLOW LENGTH(FEET) = 598.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.67
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 52.61
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 26.52
LONGEST FLOWPATH FROM NODE 40.00 TO NODE 51.00 = 4625.00 FEET.

+-----+
| END OF SYSTEM "D1" |
| |
| |
+-----+

FLOW PROCESS FROM NODE 52.00 TO NODE 53.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 355.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.902
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.64 0.69 0.100 61 13.90
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 2.35 0.69 0.600 61 18.84
SCHOOL B 2.70 0.69 0.600 61 18.84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544
SUBAREA RUNOFF(CFS) = 7.89
TOTAL AREA(ACRES) = 5.69 PEAK FLOW RATE(CFS) = 7.89

FLOW PROCESS FROM NODE 53.00 TO NODE 54.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 352.00
STREET LENGTH(FEET) = 920.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.45
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 18.55
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.75
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.87
STREET FLOW TRAVEL TIME(MIN.) = 8.75 Tc(MIN.) = 22.66
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.394
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Contains 3 rows of data.

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.50 HALFSTREET FLOOD WIDTH (FEET) = 19.10
FLOW VELOCITY (FEET/SEC.) = 1.78 DEPTH*VELOCITY (FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 54.00 = 1920.00 FEET.

FLOW PROCESS FROM NODE 54.00 TO NODE 55.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 352.00 DOWNSTREAM (FEET) = 351.00
FLOW LENGTH (FEET) = 831.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.11
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 12.26
PIPE TRAVEL TIME (MIN.) = 4.45 Tc (MIN.) = 27.10
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 55.00 = 2751.00 FEET.

FLOW PROCESS FROM NODE 55.00 TO NODE 55.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 27.10
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.240
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.48	0.69	0.100	61
SCHOOL	B	9.72	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.576
SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 7.76
EFFECTIVE AREA (ACRES) = 23.64 AREA-AVERAGED Fm (INCH/HR) = 0.39
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.56
TOTAL AREA (ACRES) = 23.6 PEAK FLOW RATE (CFS) = 18.16

FLOW PROCESS FROM NODE 55.00 TO NODE 58.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 351.00 DOWNSTREAM (FEET) = 350.00
FLOW LENGTH (FEET) = 203.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.85
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 18.16
PIPE TRAVEL TIME (MIN.) = 0.58 Tc (MIN.) = 27.68
LONGEST FLOWPATH FROM NODE 52.00 TO NODE 58.00 = 2954.00 FEET.

FLOW PROCESS FROM NODE 58.00 TO NODE 58.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 27.68
RAINFALL INTENSITY (INCH/HR) = 1.22
AREA-AVERAGED Fm (INCH/HR) = 0.39
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.56
EFFECTIVE STREAM AREA (ACRES) = 23.64
TOTAL STREAM AREA (ACRES) = 23.64
PEAK FLOW RATE (CFS) AT CONFLUENCE = 18.16

FLOW PROCESS FROM NODE 56.00 TO NODE 57.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 357.50 DOWNSTREAM (FEET) = 354.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 20.234
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.500
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	A	0.01	0.93	0.600	39	20.23
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	0.02	0.69	0.600	61	20.23
SCHOOL	A	2.66	0.93	0.600	39	20.23
SCHOOL	B	7.01	0.69	0.600	61	20.23

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA RUNOFF (CFS) = 9.15
TOTAL AREA (ACRES) = 9.70 PEAK FLOW RATE (CFS) = 9.15

FLOW PROCESS FROM NODE 57.00 TO NODE 58.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 354.00 DOWNSTREAM (FEET) = 350.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0082
CHANNEL BASE (FEET) = 100.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.217
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.36	0.69	0.100	61
SCHOOL	A	0.85	0.93	0.600	39
SCHOOL	B	7.94	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.71
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.580
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.48
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.06

AVERAGE FLOW DEPTH(FEET) = 0.12 TRAVEL TIME(MIN.) = 7.68
 Tc(MIN.) = 27.91
 SUBAREA AREA(ACRES) = 9.15 SUBAREA RUNOFF(CFS) = 6.63
 EFFECTIVE AREA(ACRES) = 18.85 AREA-AVERAGED Fm(INCH/HR) = 0.43
 AREA-AVERAGED Fp(INCH/HR) = 0.73 AREA-AVERAGED Ap = 0.59
 TOTAL AREA(ACRES) = 18.9 PEAK FLOW RATE(CFS) = 13.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.12 FLOW VELOCITY(FEET/SEC.) = 1.11
 LONGEST FLOWPATH FROM NODE 56.00 TO NODE 58.00 = 1489.00 FEET.

 FLOW PROCESS FROM NODE 58.00 TO NODE 58.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 27.91
 RAINFALL INTENSITY(INCH/HR) = 1.22
 AREA-AVERAGED Fm(INCH/HR) = 0.43
 AREA-AVERAGED Fp(INCH/HR) = 0.73
 AREA-AVERAGED Ap = 0.59
 EFFECTIVE STREAM AREA(ACRES) = 18.85
 TOTAL STREAM AREA(ACRES) = 18.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.31

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.16	27.68	1.224	0.69(0.39)	0.56	23.6	52.00
2	13.31	27.91	1.217	0.73(0.43)	0.59	18.9	56.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 31.42 Tc(MIN.) = 27.68
 EFFECTIVE AREA(ACRES) = 42.26 AREA-AVERAGED Fm(INCH/HR) = 0.41
 AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.58
 TOTAL AREA(ACRES) = 42.5
 LONGEST FLOWPATH FROM NODE 52.00 TO NODE 58.00 = 2954.00 FEET.

+-----+
 | END OF SYSTEM "D2" |
 | |
 | |
 +-----+

 FLOW PROCESS FROM NODE 70.00 TO NODE 71.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 353.50 DOWNSTREAM(FEET) = 352.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 19.181

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.553
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 2.02 0.69 0.100 61 19.18
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" B 4.15 0.69 0.600 61 26.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.436
 SUBAREA RUNOFF(CFS) = 6.96
 TOTAL AREA(ACRES) = 6.17 PEAK FLOW RATE(CFS) = 6.96

 FLOW PROCESS FROM NODE 71.00 TO NODE 72.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 352.50 DOWNSTREAM ELEVATION(FEET) = 351.00
 STREET LENGTH(FEET) = 536.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.44

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.49
 HALFSTREET FLOOD WIDTH(FEET) = 18.48
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.61
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.79
 STREET FLOW TRAVEL TIME(MIN.) = 5.55 Tc(MIN.) = 24.73
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.317

SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 2.20 0.69 0.100 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 5.48 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.457
 SUBAREA AREA(ACRES) = 7.68 SUBAREA RUNOFF(CFS) = 6.93
 EFFECTIVE AREA(ACRES) = 13.85 AREA-AVERAGED Fm(INCH/HR) = 0.31
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 12.58

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 19.88
 FLOW VELOCITY(FEET/SEC.) = 1.69 DEPTH*VELOCITY(FT*FT/SEC.) = 0.87
 LONGEST FLOWPATH FROM NODE 70.00 TO NODE 72.00 = 1536.00 FEET.

FLOW PROCESS FROM NODE 72.00 TO NODE 73.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 351.00 DOWNSTREAM ELEVATION(FEET) = 350.00
STREET LENGTH(FEET) = 1029.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.07

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.63
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.85

STREET FLOW TRAVEL TIME(MIN.) = 12.70 Tc(MIN.) = 37.43

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.006

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include COMMERCIAL, RESIDENTIAL, and "8-10 DWELLINGS/ACRE".

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.373

SUBAREA AREA(ACRES) = 10.26 SUBAREA RUNOFF(CFS) = 6.92

EFFECTIVE AREA(ACRES) = 24.11 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 15.63

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.34 DEPTH*VELOCITY(FT*FT/SEC.) = 0.83
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 73.00 = 2565.00 FEET.

FLOW PROCESS FROM NODE 73.00 TO NODE 81.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 350.00 DOWNSTREAM ELEVATION(FEET) = 346.00
STREET LENGTH(FEET) = 1450.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.85

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.56
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.93
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.08

STREET FLOW TRAVEL TIME(MIN.) = 12.54 Tc(MIN.) = 49.97

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.833

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include COMMERCIAL, RESIDENTIAL, and "3-4 DWELLINGS/ACRE".

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.459

SUBAREA AREA(ACRES) = 9.48 SUBAREA RUNOFF(CFS) = 4.42

EFFECTIVE AREA(ACRES) = 33.59 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 33.6 PEAK FLOW RATE(CFS) = 16.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.86 DEPTH*VELOCITY(FT*FT/SEC.) = 1.02
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 81.00 = 4015.00 FEET.

FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

FLOW PROCESS FROM NODE 74.00 TO NODE 75.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 351.50 DOWNSTREAM(FEET) = 349.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.969

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.749

SUBAREA Tc AND LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA, Fp, Ap, SCS, Tc.

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 5.29 0.69 0.100 61 15.97
 RESIDENTIAL
 "3-5 DWELLINGS/ACRE" B 0.01 0.69 0.600 61 21.64
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.101
 SUBAREA RUNOFF(CFS) = 8.01
 TOTAL AREA (ACRES) = 5.30 PEAK FLOW RATE (CFS) = 8.01

FLOW PROCESS FROM NODE 75.00 TO NODE 76.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 349.00 DOWNSTREAM ELEVATION(FEET) = 348.50
 STREET LENGTH(FEET) = 398.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.77

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.56
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.28
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.72
 STREET FLOW TRAVEL TIME(MIN.) = 5.16 Tc(MIN.) = 21.13
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.458

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.52	0.69	0.100	61
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.86	0.69	0.400	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.21	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.292
 SUBAREA AREA(ACRES) = 6.59 SUBAREA RUNOFF(CFS) = 7.46
 EFFECTIVE AREA(ACRES) = 11.89 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.21
 TOTAL AREA(ACRES) = 11.9 PEAK FLOW RATE(CFS) = 14.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.38 DEPTH*VELOCITY(FT*FT/SEC.) = 0.81
 LONGEST FLOWPATH FROM NODE 74.00 TO NODE 76.00 = 1398.00 FEET.

FLOW PROCESS FROM NODE 76.00 TO NODE 80.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 348.50 DOWNSTREAM ELEVATION(FEET) = 345.50
 STREET LENGTH(FEET) = 800.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.40

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.53
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.04
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.09
 STREET FLOW TRAVEL TIME(MIN.) = 6.54 Tc(MIN.) = 27.68
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.224

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.59	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	4.03	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.459
 SUBAREA AREA(ACRES) = 5.62 SUBAREA RUNOFF(CFS) = 4.60
 EFFECTIVE AREA(ACRES) = 17.51 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.29
 TOTAL AREA(ACRES) = 17.5 PEAK FLOW RATE(CFS) = 16.18

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 2.04 DEPTH*VELOCITY(FT*FT/SEC.) = 1.08
 LONGEST FLOWPATH FROM NODE 74.00 TO NODE 80.00 = 2198.00 FEET.

FLOW PROCESS FROM NODE 80.00 TO NODE 80.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 27.68
 RAINFALL INTENSITY(INCH/HR) = 1.22
 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.29
 EFFECTIVE STREAM AREA(ACRES) = 17.51

TOTAL STREAM AREA(ACRES) = 17.51
PEAK FLOW RATE(CFS) AT CONFLUENCE = 16.18

FLOW PROCESS FROM NODE 77.00 TO NODE 78.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 347.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.397

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.791

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.84	0.69	0.100	61	15.40

RESIDENTIAL

"3-5 DWELLINGS/ACRE" B 1.84 0.69 0.600 61 20.87

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443

SUBAREA RUNOFF(CFS) = 3.59

TOTAL AREA(ACRES) = 2.68 PEAK FLOW RATE(CFS) = 3.59

FLOW PROCESS FROM NODE 78.00 TO NODE 79.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 347.00 DOWNSTREAM ELEVATION(FEET) = 346.50
STREET LENGTH(FEET) = 204.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.89

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.45

HALFSTREET FLOOD WIDTH(FEET) = 15.98

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.39

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.62

STREET FLOW TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 17.84

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.628

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.57	0.69	0.100	61

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 4.02 0.69 0.600 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.460

SUBAREA AREA(ACRES) = 5.59 SUBAREA RUNOFF(CFS) = 6.60

EFFECTIVE AREA(ACRES) = 8.27 AREA-AVERAGED Fm(INCH/HR) = 0.31

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.45

TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 9.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.48

FLOW VELOCITY(FEET/SEC.) = 1.51 DEPTH*VELOCITY(FT*FT/SEC.) = 0.74

LONGEST FLOWPATH FROM NODE 77.00 TO NODE 79.00 = 1204.00 FEET.

FLOW PROCESS FROM NODE 79.00 TO NODE 80.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 346.50 DOWNSTREAM ELEVATION(FEET) = 346.00

STREET LENGTH(FEET) = 494.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.58

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.59

HALFSTREET FLOOD WIDTH(FEET) = 20.00

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.24

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.73

STREET FLOW TRAVEL TIME(MIN.) = 6.64 Tc(MIN.) = 24.47

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.325

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.12	0.69	0.100	61

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 3.83 0.69 0.600 61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.422

SUBAREA AREA(ACRES) = 5.95 SUBAREA RUNOFF(CFS) = 5.55

EFFECTIVE AREA(ACRES) = 14.22 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44

TOTAL AREA(ACRES) = 14.2 PEAK FLOW RATE(CFS) = 13.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 1.26 DEPTH*VELOCITY(FT*FT/SEC.) = 0.75

LONGEST FLOWPATH FROM NODE 77.00 TO NODE 80.00 = 1698.00 FEET.

FLOW PROCESS FROM NODE 80.00 TO NODE 80.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 24.47
RAINFALL INTENSITY(INCH/HR) = 1.33
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 14.22
TOTAL STREAM AREA(ACRES) = 14.22
PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.09

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 2 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 27.97 Tc(MIN.) = 27.68
EFFECTIVE AREA(ACRES) = 31.73 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 31.7
LONGEST FLOWPATH FROM NODE 74.00 TO NODE 80.00 = 2198.00 FEET.

FLOW PROCESS FROM NODE 80.00 TO NODE 81.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 346.00 DOWNSTREAM ELEVATION(FEET) = 345.50
STREET LENGTH(FEET) = 629.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.94
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.79
HALFSTREET FLOOD WIDTH(FEET) = 26.11
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.57
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.24
STREET FLOW TRAVEL TIME(MIN.) = 6.67 Tc(MIN.) = 34.34

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Contains 2 rows of data.

"3-4 DWELLINGS/ACRE" B 5.18 0.69 0.600 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA(ACRES) = 6.18 SUBAREA RUNOFF(CFS) = 3.93
EFFECTIVE AREA(ACRES) = 37.91 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 27.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.77 HALFSTREET FLOOD WIDTH(FEET) = 25.26
FLOW VELOCITY(FEET/SEC.) = 1.54 DEPTH*VELOCITY(FT*FT/SEC.) = 1.19
LONGEST FLOWPATH FROM NODE 74.00 TO NODE 81.00 = 2827.00 FEET.

FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 1 row of data.

** MEMORY BANK # 1 CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 1 row of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 41.73 Tc(MIN.) = 34.345
EFFECTIVE AREA(ACRES) = 57.78 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 71.5
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 81.00 = 4015.00 FEET.

FLOW PROCESS FROM NODE 81.00 TO NODE 81.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 81.00 TO NODE 87.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 345.50 DOWNSTREAM ELEVATION(FEET) = 345.00

STREET LENGTH (FEET) = 532.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 43.61
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.87
 HALfstREET FLOOD WIDTH (FEET) = 30.26
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.84
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.60
 STREET FLOW TRAVEL TIME (MIN.) = 4.82 Tc (MIN.) = 39.17
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.976
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.31	0.93	0.100	39
COMMERCIAL	B	1.92	0.69	0.100	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	0.53	0.93	0.500	39
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.97	0.69	0.500	61

SUBAREA AVERAGE PervIOUS LOSS RATE, Fp (INCH/HR) = 0.72
 SUBAREA AVERAGE PervIOUS AREA FRACTION, Ap = 0.344
 SUBAREA AREA (ACRES) = 5.73 SUBAREA RUNOFF (CFS) = 3.75
 EFFECTIVE AREA (ACRES) = 63.51 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 77.2 PEAK FLOW RATE (CFS) = 41.73
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.86 HALfstREET FLOOD WIDTH (FEET) = 29.59
 FLOW VELOCITY (FEET/SEC.) = 1.82 DEPTH*VELOCITY (FT*FT/SEC.) = 1.56
 LONGEST FLOWPATH FROM NODE 70.00 TO NODE 87.00 = 4547.00 FEET.

 FLOW PROCESS FROM NODE 87.00 TO NODE 87.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<<

 FLOW PROCESS FROM NODE 82.00 TO NODE 83.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 355.50 DOWNSTREAM (FEET) = 350.50

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 13.902
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.914
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.70	0.69	0.100	61	13.90
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	3.74	0.69	0.600	61	18.84

SUBAREA AVERAGE PervIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PervIOUS AREA FRACTION, Ap = 0.521
 SUBAREA RUNOFF (CFS) = 6.22
 TOTAL AREA (ACRES) = 4.44 PEAK FLOW RATE (CFS) = 6.22

 FLOW PROCESS FROM NODE 83.00 TO NODE 86.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<

 UPSTREAM ELEVATION (FEET) = 350.50 DOWNSTREAM ELEVATION (FEET) = 350.00
 STREET LENGTH (FEET) = 849.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.56
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.57
 HALfstREET FLOOD WIDTH (FEET) = 20.00
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 0.90
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.51
 STREET FLOW TRAVEL TIME (MIN.) = 15.64 Tc (MIN.) = 29.54
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.173
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.59	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	0.15	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	5.57	0.69	0.600	61

SUBAREA AVERAGE PervIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PervIOUS AREA FRACTION, Ap = 0.553
 SUBAREA AREA (ACRES) = 6.31 SUBAREA RUNOFF (CFS) = 4.49
 EFFECTIVE AREA (ACRES) = 10.75 AREA-AVERAGED Fm (INCH/HR) = 0.37
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.54
 TOTAL AREA (ACRES) = 10.8 PEAK FLOW RATE (CFS) = 7.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 0.87 DEPTH*VELOCITY(FT*FT/SEC.) = 0.48
LONGEST FLOWPATH FROM NODE 82.00 TO NODE 86.00 = 1849.00 FEET.

FLOW PROCESS FROM NODE 86.00 TO NODE 86.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 29.54
RAINFALL INTENSITY(INCH/HR) = 1.17
AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.54
EFFECTIVE STREAM AREA(ACRES) = 10.75
TOTAL STREAM AREA(ACRES) = 10.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.74

FLOW PROCESS FROM NODE 84.00 TO NODE 85.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 352.00 DOWNSTREAM(FEET) = 350.50

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.687
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.637
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.64 0.69 0.100 61 17.69
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 4.43 0.69 0.600 61 23.97
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537
SUBAREA RUNOFF(CFS) = 5.79
TOTAL AREA(ACRES) = 5.07 PEAK FLOW RATE(CFS) = 5.79

FLOW PROCESS FROM NODE 85.00 TO NODE 86.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 350.50 DOWNSTREAM ELEVATION(FEET) = 350.00
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.22

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 19.02
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.05
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.53
STREET FLOW TRAVEL TIME(MIN.) = 6.87 Tc(MIN.) = 24.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.323
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.09 0.93 0.100 39
COMMERCIAL B 0.19 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" A 1.61 0.93 0.600 39
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 1.73 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.80
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 3.62 SUBAREA RUNOFF(CFS) = 2.84
EFFECTIVE AREA(ACRES) = 8.69 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.74 AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 8.7 PEAK FLOW RATE(CFS) = 7.20

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 19.02
FLOW VELOCITY(FEET/SEC.) = 1.05 DEPTH*VELOCITY(FT*FT/SEC.) = 0.53
LONGEST FLOWPATH FROM NODE 84.00 TO NODE 86.00 = 1434.00 FEET.

FLOW PROCESS FROM NODE 86.00 TO NODE 86.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 24.55
RAINFALL INTENSITY(INCH/HR) = 1.32
AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.74
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA(ACRES) = 8.69
TOTAL STREAM AREA(ACRES) = 8.69
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.20

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 7.74 29.54 1.173 0.69(0.37) 0.54 10.8 82.00
2 7.20 24.55 1.323 0.74(0.40) 0.55 8.7 84.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 13.77 Tc(MIN.) = 29.54

EFFECTIVE AREA(ACRES) = 19.44 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 19.4
LONGEST FLOWPATH FROM NODE 82.00 TO NODE 86.00 = 1849.00 FEET.

FLOW PROCESS FROM NODE 86.00 TO NODE 87.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 350.00 DOWNSTREAM ELEVATION(FEET) = 345.00
STREET LENGTH(FEET) = 1518.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.52
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.53
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.92
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.02
STREET FLOW TRAVEL TIME(MIN.) = 13.19 Tc(MIN.) = 42.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.923

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.32	0.93	0.100	39
COMMERCIAL	B	1.93	0.69	0.100	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	A	0.54	0.93	0.500	39
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.97	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.72
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
SUBAREA AREA(ACRES) = 5.76 SUBAREA RUNOFF(CFS) = 3.49
EFFECTIVE AREA(ACRES) = 25.20 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 25.2 PEAK FLOW RATE(CFS) = 13.77
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 19.96
FLOW VELOCITY(FEET/SEC.) = 1.83 DEPTH*VELOCITY(FT*FT/SEC.) = 0.95
LONGEST FLOWPATH FROM NODE 82.00 TO NODE 87.00 = 3367.00 FEET.

FLOW PROCESS FROM NODE 87.00 TO NODE 87.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	13.77	42.74	0.923	0.71(0.35)	0.50	25.2	82.00

LONGEST FLOWPATH FROM NODE 82.00 TO NODE 87.00 = 3367.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	41.73	39.17	0.976	0.69(0.27)	0.39	63.5	70.00

LONGEST FLOWPATH FROM NODE 70.00 TO NODE 87.00 = 4547.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 54.92 Tc(MIN.) = 39.169
EFFECTIVE AREA(ACRES) = 85.57 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.70 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 102.4
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 87.00 = 4547.00 FEET.

FLOW PROCESS FROM NODE 87.00 TO NODE 87.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<
=====

FLOW PROCESS FROM NODE 87.00 TO NODE 98.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 344.00
FLOW LENGTH(FEET) = 1162.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.02
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 54.92
PIPE TRAVEL TIME(MIN.) = 4.82 Tc(MIN.) = 43.99
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<<
=====

FLOW PROCESS FROM NODE 88.00 TO NODE 89.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 348.00 DOWNSTREAM(FEET) = 347.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 22.033
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.419
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.40	0.69	0.100	61	22.03
SCHOOL	B	3.69	0.69	0.600	61	29.86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.462
 SUBAREA RUNOFF(CFS) = 5.05
 TOTAL AREA(ACRES) = 5.09 PEAK FLOW RATE(CFS) = 5.05

 FLOW PROCESS FROM NODE 89.00 TO NODE 93.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 347.50 DOWNSTREAM ELEVATION(FEET) = 346.50
 STREET LENGTH(FEET) = 1607.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.76
 STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.55
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 0.88
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.49
 STREET FLOW TRAVEL TIME(MIN.) = 30.29 Tc(MIN.) = 52.33

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	6.65	0.69	0.100	61	
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	2.25	0.69	0.600	61	28.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.226
 SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 5.23
 EFFECTIVE AREA(ACRES) = 13.99 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 7.49

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 0.87 DEPTH*VELOCITY(FT*FT/SEC.) = 0.48
 LONGEST FLOWPATH FROM NODE 88.00 TO NODE 93.00 = 2607.00 FEET.

 FLOW PROCESS FROM NODE 93.00 TO NODE 93.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 52.33
 RAINFALL INTENSITY(INCH/HR) = 0.81
 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.31
 EFFECTIVE STREAM AREA(ACRES) = 13.99
 TOTAL STREAM AREA(ACRES) = 13.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.49

 FLOW PROCESS FROM NODE 90.00 TO NODE 91.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 922.00
 ELEVATION DATA: UPSTREAM(FEET) = 348.00 DOWNSTREAM(FEET) = 347.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.985
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.465
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.89	0.69	0.100	61	20.99
RESIDENTIAL "3-5 DWELLINGS/ACRE"	B	1.97	0.69	0.600	61	28.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.444
 SUBAREA RUNOFF(CFS) = 2.99
 TOTAL AREA(ACRES) = 2.86 PEAK FLOW RATE(CFS) = 2.99

 FLOW PROCESS FROM NODE 91.00 TO NODE 92.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 347.50 DOWNSTREAM ELEVATION(FEET) = 347.00
 STREET LENGTH(FEET) = 305.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.54
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.45
HALFSTREET FLOOD WIDTH(FEET) = 15.90
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.13
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.50
STREET FLOW TRAVEL TIME(MIN.) = 4.50 Tc(MIN.) = 25.48
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.291
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.91	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	3.78	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.432
SUBAREA AREA(ACRES) = 5.69 SUBAREA RUNOFF(CFS) = 5.09
EFFECTIVE AREA(ACRES) = 8.55 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 7.63

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.16
FLOW VELOCITY(FEET/SEC.) = 1.22 DEPTH*VELOCITY(FT*FT/SEC.) = 0.59
LONGEST FLOWPATH FROM NODE 90.00 TO NODE 92.00 = 1227.00 FEET.

FLOW PROCESS FROM NODE 92.00 TO NODE 93.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 347.00 DOWNSTREAM ELEVATION(FEET) = 346.50
STREET LENGTH(FEET) = 652.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

COMMERCIAL	B	2.98	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	6.40	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.441
SUBAREA AREA(ACRES) = 9.38 SUBAREA RUNOFF(CFS) = 6.21
EFFECTIVE AREA(ACRES) = 17.93 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 11.90

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.11 DEPTH*VELOCITY(FT*FT/SEC.) = 0.67
LONGEST FLOWPATH FROM NODE 90.00 TO NODE 93.00 = 1879.00 FEET.

FLOW PROCESS FROM NODE 93.00 TO NODE 93.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 35.62
RAINFALL INTENSITY(INCH/HR) = 1.04
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 17.93
TOTAL STREAM AREA(ACRES) = 17.93
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.90

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.49	52.33	0.809	0.69(0.21)	0.31	14.0	88.00
2	11.90	35.62	1.039	0.69(0.30)	0.44	17.9	90.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 18.19 Tc(MIN.) = 35.62
EFFECTIVE AREA(ACRES) = 26.41 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 31.9
LONGEST FLOWPATH FROM NODE 88.00 TO NODE 93.00 = 2607.00 FEET.

FLOW PROCESS FROM NODE 93.00 TO NODE 94.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 346.50 DOWNSTREAM ELEVATION(FEET) = 346.00
STREET LENGTH(FEET) = 465.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.04

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.67
HALFSTREET FLOOD WIDTH(FEET) = 20.25
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.55
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.04
STREET FLOW TRAVEL TIME(MIN.) = 5.01 Tc(MIN.) = 40.64
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.93	0.69	0.100	61
RESIDENTIAL					

"3-4 DWELLINGS/ACRE" B 6.89 0.69 0.600 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.451

SUBAREA AREA(ACRES) = 9.82 SUBAREA RUNOFF(CFS) = 5.69

EFFECTIVE AREA(ACRES) = 36.23 AREA-AVERAGED Fm(INCH/HR) = 0.28

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.41

TOTAL AREA(ACRES) = 41.7 PEAK FLOW RATE(CFS) = 21.86

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 HALFSTREET FLOOD WIDTH(FEET) = 20.62
FLOW VELOCITY(FEET/SEC.) = 1.57 DEPTH*VELOCITY(FT*FT/SEC.) = 1.07
LONGEST FLOWPATH FROM NODE 88.00 TO NODE 94.00 = 3072.00 FEET.

FLOW PROCESS FROM NODE 94.00 TO NODE 95.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 346.00 DOWNSTREAM ELEVATION(FEET) = 345.00
STREET LENGTH(FEET) = 319.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.50

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.27

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.37
STREET FLOW TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 42.97
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.919

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.78	0.69	0.100	61
RESIDENTIAL					

"3-4 DWELLINGS/ACRE" B 6.90 0.69 0.600 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA AREA(ACRES) = 9.68 SUBAREA RUNOFF(CFS) = 5.28

EFFECTIVE AREA(ACRES) = 45.91 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 26.03

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.32 DEPTH*VELOCITY(FT*FT/SEC.) = 1.42
LONGEST FLOWPATH FROM NODE 88.00 TO NODE 95.00 = 3391.00 FEET.

FLOW PROCESS FROM NODE 95.00 TO NODE 98.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 345.00 DOWNSTREAM ELEVATION(FEET) = 344.00
STREET LENGTH(FEET) = 267.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.02

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.48
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.50
STREET FLOW TRAVEL TIME(MIN.) = 1.79 Tc(MIN.) = 44.77
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.80	0.69	0.100	61
RESIDENTIAL					

"3-4 DWELLINGS/ACRE" B 1.49 0.69 0.600 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.326

SUBAREA AREA(ACRES) = 3.29 SUBAREA RUNOFF(CFS) = 1.99

EFFECTIVE AREA(ACRES) = 49.20 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 54.7 PEAK FLOW RATE(CFS) = 27.02

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.48 DEPTH*VELOCITY(FT*FT/SEC.) = 1.50
LONGEST FLOWPATH FROM NODE 88.00 TO NODE 98.00 = 3658.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	27.02	44.77	0.895	0.69(0.28)	0.42	49.2	88.00

LONGEST FLOWPATH FROM NODE 88.00 TO NODE 98.00 = 3658.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.92	43.99	0.905	0.70(0.29)	0.42	85.6	70.00

LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 81.71 Tc(MIN.) = 43.989
EFFECTIVE AREA(ACRES) = 133.54 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 157.1
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 96.00 TO NODE 97.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 653.00
ELEVATION DATA: UPSTREAM(FEET) = 346.00 DOWNSTREAM(FEET) = 345.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.853
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.834

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.89	0.69	0.100	61	14.85
RESIDENTIAL "3-5 DWELLINGS/ACRE"	B	2.79	0.69	0.600	61	20.13

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.479
SUBAREA RUNOFF(CFS) = 4.98
TOTAL AREA(ACRES) = 3.68 PEAK FLOW RATE(CFS) = 4.98

FLOW PROCESS FROM NODE 97.00 TO NODE 98.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 345.00 DOWNSTREAM ELEVATION(FEET) = 344.00
STREET LENGTH(FEET) = 554.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.95

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.47

HALFSTREET FLOOD WIDTH(FEET) = 17.15

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.23

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.58

STREET FLOW TRAVEL TIME(MIN.) = 7.49 Tc(MIN.) = 22.34

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.406

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	3.15	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.489
SUBAREA AREA(ACRES) = 4.05 SUBAREA RUNOFF(CFS) = 3.90
EFFECTIVE AREA(ACRES) = 7.73 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 7.7 PEAK FLOW RATE(CFS) = 7.47

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.62
FLOW VELOCITY(FEET/SEC.) = 1.26 DEPTH*VELOCITY(FT*FT/SEC.) = 0.60
LONGEST FLOWPATH FROM NODE 96.00 TO NODE 98.00 = 1207.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 11

=====
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
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** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.47	22.34	1.406	0.69(0.33)	0.48	7.7	96.00

LONGEST FLOWPATH FROM NODE 96.00 TO NODE 98.00 = 1207.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	81.71	43.99	0.905	0.69(0.29)	0.42	133.5	70.00

LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 85.70 Tc(MIN.) = 43.989
EFFECTIVE AREA (ACRES) = 141.27 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 164.9
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 98.00 = 5709.00 FEET.

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
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+-----+
| END OF SYSTEM "E" |
| |
| |
+-----+

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 360.00 DOWNSTREAM (FEET) = 356.50

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.930
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.828

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	3.14	0.69	0.100	61	14.93
PUBLIC PARK	B	0.70	0.69	0.850	61	23.72
COMMERCIAL	B	0.92	0.69	0.100	61	14.93

RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 0.82 0.69 0.600 61 20.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.268
SUBAREA RUNOFF (CFS) = 8.26

TOTAL AREA (ACRES) = 5.58 PEAK FLOW RATE (CFS) = 8.26

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION (FEET) = 356.50 DOWNSTREAM ELEVATION (FEET) = 354.00
STREET LENGTH (FEET) = 1571.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.43

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.54
HALFSTREET FLOOD WIDTH (FEET) = 20.00
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.36
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.74
STREET FLOW TRAVEL TIME (MIN.) = 19.21 Tc (MIN.) = 34.14
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.068

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.41	0.69	0.100	61
PUBLIC PARK	B	1.65	0.69	0.850	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.36	0.69	0.600	61
SCHOOL	B	1.87	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.515
SUBAREA AREA (ACRES) = 9.29 SUBAREA RUNOFF (CFS) = 5.97
EFFECTIVE AREA (ACRES) = 14.87 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 14.9 PEAK FLOW RATE (CFS) = 10.41

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 20.00
FLOW VELOCITY (FEET/SEC.) = 1.32 DEPTH*VELOCITY (FT*FT/SEC.) = 0.70
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 2571.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 116.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION (FEET) = 354.00 DOWNSTREAM ELEVATION (FEET) = 353.00
STREET LENGTH (FEET) = 1268.00 CURB HEIGHT (INCHES) = 8.0

TOTAL AREA (ACRES) = 23.6 PEAK FLOW RATE (CFS) = 22.72

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.54 HALFSTREET FLOOD WIDTH (FEET) = 20.00
FLOW VELOCITY (FEET/SEC.) = 2.76 DEPTH*VELOCITY (FT*FT/SEC.) = 1.48
LONGEST FLOWPATH FROM NODE 113.00 TO NODE 115.00 = 1616.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 353.50 DOWNSTREAM ELEVATION (FEET) = 353.00
STREET LENGTH (FEET) = 405.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.56

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.71

HALFSTREET FLOOD WIDTH (FEET) = 22.02

AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.76

PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.24

STREET FLOW TRAVEL TIME (MIN.) = 3.84 Tc (MIN.) = 25.85

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.279

SUBAREA LOSS RATE DATA (AMC II):

Table with 6 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include COMMERCIAL, PUBLIC PARK, and SCHOOL.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588

SUBAREA AREA (ACRES) = 9.73 SUBAREA RUNOFF (CFS) = 7.67

EFFECTIVE AREA (ACRES) = 33.29 AREA-AVERAGED Fm (INCH/HR) = 0.36

AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.53

TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 27.40

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.71 HALFSTREET FLOOD WIDTH (FEET) = 22.33
FLOW VELOCITY (FEET/SEC.) = 1.78 DEPTH*VELOCITY (FT*FT/SEC.) = 1.27
LONGEST FLOWPATH FROM NODE 113.00 TO NODE 116.00 = 2021.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 25.85
RAINFALL INTENSITY (INCH/HR) = 1.28
AREA-AVERAGED Fm (INCH/HR) = 0.36
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.53
EFFECTIVE STREAM AREA (ACRES) = 33.29
TOTAL STREAM AREA (ACRES) = 33.29
PEAK FLOW RATE (CFS) AT CONFLUENCE = 27.40

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 35.15 Tc (MIN.) = 25.85
EFFECTIVE AREA (ACRES) = 41.47 AREA-AVERAGED Fm (INCH/HR) = 0.35
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.52
TOTAL AREA (ACRES) = 55.0
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 117.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 353.00 DOWNSTREAM ELEVATION (FEET) = 349.50
STREET LENGTH (FEET) = 707.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 39.28

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.64

HALFSTREET FLOOD WIDTH (FEET) = 20.00

AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.15

PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.02

STREET FLOW TRAVEL TIME (MIN.) = 3.75 Tc (MIN.) = 29.60

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.171

SUBAREA LOSS RATE DATA (AMC II):

Table with 6 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include COMMERCIAL and RESIDENTIAL.

"3-4 DWELLINGS/ACRE" B 5.35 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.368
 SUBAREA AREA (ACRES) = 9.99 SUBAREA RUNOFF (CFS) = 8.26
 EFFECTIVE AREA (ACRES) = 51.46 AREA-AVERAGED Fm (INCH/HR) = 0.33
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
 TOTAL AREA (ACRES) = 65.0 PEAK FLOW RATE (CFS) = 38.76

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.64 HALFSTREET FLOOD WIDTH (FEET) = 20.00
 FLOW VELOCITY (FEET/SEC.) = 3.13 DEPTH*VELOCITY (FT*FT/SEC.) = 2.01
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 117.00 = 4546.00 FEET.

 FLOW PROCESS FROM NODE 117.00 TO NODE 123.00 IS CODE = 62

 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

 UPSTREAM ELEVATION (FEET) = 349.50 DOWNSTREAM ELEVATION (FEET) = 347.50
 STREET LENGTH (FEET) = 613.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.25
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.70
 HALFSTREET FLOOD WIDTH (FEET) = 21.78
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.84
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.99
 STREET FLOW TRAVEL TIME (MIN.) = 3.60 Tc (MIN.) = 33.20
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.087

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.16	0.69	0.100	61
COMMERCIAL	B	2.76	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.03	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.165
 SUBAREA AREA (ACRES) = 7.95 SUBAREA RUNOFF (CFS) = 6.97
 EFFECTIVE AREA (ACRES) = 59.41 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
 TOTAL AREA (ACRES) = 72.9 PEAK FLOW RATE (CFS) = 41.83

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.70 HALFSTREET FLOOD WIDTH (FEET) = 21.66
 FLOW VELOCITY (FEET/SEC.) = 2.83 DEPTH*VELOCITY (FT*FT/SEC.) = 1.98

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 123.00 = 5159.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 1

 >>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<

 TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 33.20
 RAINFALL INTENSITY (INCH/HR) = 1.09
 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.44
 EFFECTIVE STREAM AREA (ACRES) = 59.41
 TOTAL STREAM AREA (ACRES) = 72.94
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 41.83

 FLOW PROCESS FROM NODE 118.00 TO NODE 119.00 IS CODE = 21

 >>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<<<
 >> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA <<

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 359.00 DOWNSTREAM (FEET) = 353.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 13.404
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.960
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	7.15	0.69	0.100	61	13.40
COMMERCIAL	B	0.56	0.69	0.100	61	13.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 13.13
 TOTAL AREA (ACRES) = 7.71 PEAK FLOW RATE (CFS) = 13.13

 FLOW PROCESS FROM NODE 119.00 TO NODE 120.00 IS CODE = 62

 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

 UPSTREAM ELEVATION (FEET) = 353.00 DOWNSTREAM ELEVATION (FEET) = 350.00
 STREET LENGTH (FEET) = 655.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.05
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.53
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.26
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.20
 STREET FLOW TRAVEL TIME(MIN.) = 4.83 Tc(MIN.) = 18.24
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.605
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.49	0.69	0.100	61
COMMERCIAL	B	0.76	0.69	0.100	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	1.03	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.157
 SUBAREA AREA(ACRES) = 7.28 SUBAREA RUNOFF(CFS) = 9.81
 EFFECTIVE AREA(ACRES) = 14.99 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.13
 TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 20.47

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 2.37 DEPTH*VELOCITY(FT*FT/SEC.) = 1.30
 LONGEST FLOWPATH FROM NODE 118.00 TO NODE 120.00 = 1655.00 FEET.

 FLOW PROCESS FROM NODE 120.00 TO NODE 123.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 350.00 DOWNSTREAM ELEVATION(FEET) = 347.50
 STREET LENGTH(FEET) = 1075.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.57
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.64
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.14
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.38
 STREET FLOW TRAVEL TIME(MIN.) = 8.35 Tc(MIN.) = 26.59
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.256
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.20	0.69	0.100	61
COMMERCIAL	B	1.37	0.69	0.100	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	1.03	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.136
 SUBAREA AREA(ACRES) = 11.60 SUBAREA RUNOFF(CFS) = 12.14
 EFFECTIVE AREA(ACRES) = 26.59 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.13
 TOTAL AREA(ACRES) = 26.6 PEAK FLOW RATE(CFS) = 27.90

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 2.18 DEPTH*VELOCITY(FT*FT/SEC.) = 1.42
 LONGEST FLOWPATH FROM NODE 118.00 TO NODE 123.00 = 2730.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 26.59
 RAINFALL INTENSITY(INCH/HR) = 1.26
 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.13
 EFFECTIVE STREAM AREA(ACRES) = 26.59
 TOTAL STREAM AREA(ACRES) = 26.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 27.90

 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 352.50 DOWNSTREAM(FEET) = 349.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.930
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.828
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	2.23	0.69	0.100	61	14.93
RESIDENTIAL "3-5 DWELLINGS/ACRE"	B	4.74	0.69	0.600	61	20.23

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.440
 SUBAREA RUNOFF(CFS) = 9.57
 TOTAL AREA(ACRES) = 6.97 PEAK FLOW RATE(CFS) = 9.57

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 349.00 DOWNSTREAM ELEVATION(FEET) = 347.50
STREET LENGTH(FEET) = 1001.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.63
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.74
STREET FLOW TRAVEL TIME(MIN.) = 12.38 Tc(MIN.) = 27.31

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.234

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.68 0.69 0.100 61
RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 3.10 0.69 0.600 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.424

SUBAREA AREA(ACRES) = 4.78 SUBAREA RUNOFF(CFS) = 4.06

EFFECTIVE AREA(ACRES) = 11.75 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 11.8 PEAK FLOW RATE(CFS) = 9.91

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.27 DEPTH*VELOCITY(FT*FT/SEC.) = 0.67
LONGEST FLOWPATH FROM NODE 121.00 TO NODE 123.00 = 2001.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 27.31
RAINFALL INTENSITY(INCH/HR) = 1.23
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.43

EFFECTIVE STREAM AREA(ACRES) = 11.75
TOTAL STREAM AREA(ACRES) = 11.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.91

** CONFLUENCE DATA **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 41.83 33.20 1.087 0.69(0.30) 0.44 59.4 113.00
2 27.90 26.59 1.256 0.69(0.09) 0.13 26.6 118.00
3 9.91 27.31 1.234 0.69(0.30) 0.43 11.8 121.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 74.04 Tc(MIN.) = 33.20
EFFECTIVE AREA(ACRES) = 97.75 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 111.3
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 123.00 = 5159.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 347.50 DOWNSTREAM ELEVATION(FEET) = 346.00
STREET LENGTH(FEET) = 609.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.29

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.90
HALFSTREET FLOOD WIDTH(FEET) = 31.67
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.04
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.73
STREET FLOW TRAVEL TIME(MIN.) = 3.34 Tc(MIN.) = 36.55

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.021

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 4.71 0.69 0.100 61
RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 3.10 0.69 0.600 61

SCHOOL B 1.38 0.69 0.600 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.344

SUBAREA AREA(ACRES) = 9.19 SUBAREA RUNOFF(CFS) = 6.50

EFFECTIVE AREA(ACRES) = 106.94 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36

TOTAL AREA (ACRES) = 120.5 PEAK FLOW RATE (CFS) = 74.76

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.89 HALFSTREET FLOOD WIDTH (FEET) = 31.12
FLOW VELOCITY (FEET/SEC.) = 3.02 DEPTH*VELOCITY (FT*FT/SEC.) = 2.68
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 124.00 = 5768.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 127.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 346.00 DOWNSTREAM ELEVATION (FEET) = 345.50
STREET LENGTH (FEET) = 726.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 77.17

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 1.13
HALFSTREET FLOOD WIDTH (FEET) = 43.02
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.82
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.05
STREET FLOW TRAVEL TIME (MIN.) = 6.65 Tc (MIN.) = 43.20
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.916

SUBAREA LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows include COMMERCIAL, RESIDENTIAL, and SCHOOL.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367
SUBAREA AREA (ACRES) = 8.05 SUBAREA RUNOFF (CFS) = 4.81
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
TOTAL AREA (ACRES) = 128.5 PEAK FLOW RATE (CFS) = 74.76

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 1.11 HALFSTREET FLOOD WIDTH (FEET) = 42.41
FLOW VELOCITY (FEET/SEC.) = 1.81 DEPTH*VELOCITY (FT*FT/SEC.) = 2.01
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 127.00 = 6494.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 43.20
RAINFALL INTENSITY (INCH/HR) = 0.92
AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.36
EFFECTIVE STREAM AREA (ACRES) = 114.99
TOTAL STREAM AREA (ACRES) = 128.52
PEAK FLOW RATE (CFS) AT CONFLUENCE = 74.76

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 348.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 12.997
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.000
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 5.34 0.69 0.100 61 13.00
COMMERCIAL B 0.86 0.69 0.100 61 13.00
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 10.78
TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 10.78

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 348.00 DOWNSTREAM ELEVATION (FEET) = 345.50
STREET LENGTH (FEET) = 1360.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.37

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.72
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.03
 STREET FLOW TRAVEL TIME(MIN.) = 13.18 Tc(MIN.) = 26.18
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.269
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	10.10	0.69	0.100	61
COMMERCIAL	B	0.48	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.67	0.69	0.600	61
COMMERCIAL	B	1.85	0.69	0.100	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.159
 SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 14.71
 EFFECTIVE AREA(ACRES) = 20.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.14
 TOTAL AREA(ACRES) = 20.3 PEAK FLOW RATE(CFS) = 21.41

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.83 DEPTH*VELOCITY(FT*FT/SEC.) = 1.14
 LONGEST FLOWPATH FROM NODE 125.00 TO NODE 127.00 = 2360.00 FEET.

 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 26.18
 RAINFALL INTENSITY(INCH/HR) = 1.27
 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.14
 EFFECTIVE STREAM AREA(ACRES) = 20.30
 TOTAL STREAM AREA(ACRES) = 20.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.41

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	74.76	43.20	0.916	0.69(0.25)	0.36	115.0	113.00
2	21.41	26.18	1.269	0.69(0.10)	0.14	20.3	125.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 89.73 Tc(MIN.) = 43.20
 EFFECTIVE AREA(ACRES) = 135.29 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.32
 TOTAL AREA(ACRES) = 148.8
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 127.00 = 6494.00 FEET.

 FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 345.50 DOWNSTREAM ELEVATION(FEET) = 345.00
 STREET LENGTH(FEET) = 773.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 96.09

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 1.23
 HALFSTREET FLOOD WIDTH(FEET) = 48.33
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.84
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.27
 STREET FLOW TRAVEL TIME(MIN.) = 6.99 Tc(MIN.) = 50.19
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.831

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	17.21	0.69	0.100	61
COMMERCIAL	B	0.58	0.69	0.100	61
COMMERCIAL	B	0.75	0.69	0.100	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 18.54 SUBAREA RUNOFF(CFS) = 12.72
 EFFECTIVE AREA(ACRES) = 153.83 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 167.4 PEAK FLOW RATE(CFS) = 89.73
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 1.20 HALFSTREET FLOOD WIDTH(FEET) = 46.86
 FLOW VELOCITY(FEET/SEC.) = 1.82 DEPTH*VELOCITY(FT*FT/SEC.) = 2.19
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 773.0 FT WITH ELEVATION-DROP = 0.5 FT, IS 25.0 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 128.00
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 128.00 = 7267.00 FEET.

 FLOW PROCESS FROM NODE 128.00 TO NODE 136.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 345.00 DOWNSTREAM ELEVATION(FEET) = 344.50
 STREET LENGTH(FEET) = 895.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 94.94
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 1.26
 HALFSTREET FLOOD WIDTH(FEET) = 49.73
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.73
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.18
 STREET FLOW TRAVEL TIME(MIN.) = 8.62 Tc(MIN.) = 58.81
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.750
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	14.22	0.69	0.100	61
COMMERCIAL	B	0.89	0.69	0.100	61
COMMERCIAL	B	0.70	0.69	0.100	61
COMMERCIAL	B	1.20	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 17.01 SUBAREA RUNOFF(CFS) = 10.43
 EFFECTIVE AREA(ACRES) = 170.84 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.28
 TOTAL AREA(ACRES) = 184.4 PEAK FLOW RATE(CFS) = 89.73
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 1.24 HALFSTREET FLOOD WIDTH(FEET) = 48.45
 FLOW VELOCITY(FEET/SEC.) = 1.71 DEPTH*VELOCITY(FT*FT/SEC.) = 2.12
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 895.0 FT WITH ELEVATION-DROP = 0.5 FT, IS 21.6 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 136.00
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 136.00 = 8162.00 FEET.

 FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 58.81
 RAINFALL INTENSITY(INCH/HR) = 0.75
 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.28
 EFFECTIVE STREAM AREA(ACRES) = 170.84
 TOTAL STREAM AREA(ACRES) = 184.37
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 89.73

FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 351.50 DOWNSTREAM(FEET) = 349.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.969
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.749
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.94	0.69	0.100	61	15.97
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	3.84	0.69	0.600	61	21.64

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.432
 SUBAREA RUNOFF(CFS) = 7.56
 TOTAL AREA(ACRES) = 5.78 PEAK FLOW RATE(CFS) = 7.56

 FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

 UPSTREAM ELEVATION(FEET) = 349.00 DOWNSTREAM ELEVATION(FEET) = 347.50
 STREET LENGTH(FEET) = 401.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.94
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.47
 HALFSTREET FLOOD WIDTH(FEET) = 17.07
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.78
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.83
 STREET FLOW TRAVEL TIME(MIN.) = 3.76 Tc(MIN.) = 19.73
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.525
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.52	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.76	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.422
 SUBAREA AREA(ACRES) = 4.28 SUBAREA RUNOFF(CFS) = 4.76

EFFECTIVE AREA(ACRES) = 10.06 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 10.1 PEAK FLOW RATE(CFS) = 11.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.85
FLOW VELOCITY(FEET/SEC.) = 1.83 DEPTH*VELOCITY(FT*FT/SEC.) = 0.88
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 131.00 = 1401.00 FEET.

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 347.50 DOWNSTREAM ELEVATION(FEET) = 347.00
STREET LENGTH(FEET) = 581.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.80

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.63
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.26
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.79
STREET FLOW TRAVEL TIME(MIN.) = 7.69 Tc(MIN.) = 27.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.231

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.45	0.69	0.100	61
COMMERCIAL	B	1.38	0.69	0.100	61
SCHOOL	B	4.41	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.368

SUBAREA AREA(ACRES) = 8.24 SUBAREA RUNOFF(CFS) = 7.26

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.27

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.40

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 15.75

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.29 DEPTH*VELOCITY(FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 132.00 = 1982.00 FEET.

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 347.00 DOWNSTREAM ELEVATION(FEET) = 346.00
STREET LENGTH(FEET) = 741.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.33

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.62
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.57
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
STREET FLOW TRAVEL TIME(MIN.) = 7.89 Tc(MIN.) = 35.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.044

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.84	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.69	0.69	0.600	61
SCHOOL	B	5.51	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.486

SUBAREA AREA(ACRES) = 8.04 SUBAREA RUNOFF(CFS) = 5.15

EFFECTIVE AREA(ACRES) = 26.34 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 26.3 PEAK FLOW RATE(CFS) = 17.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.55 DEPTH*VELOCITY(FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 133.00 = 2723.00 FEET.

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 346.00 DOWNSTREAM ELEVATION(FEET) = 345.50
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.42
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.71
HALFSTREET FLOOD WIDTH(FEET) = 22.33
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.33
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.95
STREET FLOW TRAVEL TIME(MIN.) = 9.09 Tc(MIN.) = 44.40
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.900
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.02	0.69	0.100	61
RESIDENTIAL					

"3-4 DWELLINGS/ACRE"	B	6.67	0.69	0.600	61
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.444
SUBAREA AREA(ACRES) = 9.69 SUBAREA RUNOFF(CFS) = 5.19
EFFECTIVE AREA(ACRES) = 36.03 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 36.0 PEAK FLOW RATE(CFS) = 19.59

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.70 HALFSTREET FLOOD WIDTH(FEET) = 21.84
FLOW VELOCITY(FEET/SEC.) = 1.31 DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 134.00 = 3447.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 345.50 DOWNSTREAM ELEVATION(FEET) = 345.00
STREET LENGTH(FEET) = 746.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.33
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.74
HALFSTREET FLOOD WIDTH(FEET) = 23.55
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.00

STREET FLOW TRAVEL TIME(MIN.) = 9.19 Tc(MIN.) = 53.58
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.796

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.82	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.42	0.69	0.600	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.03	0.69	0.500	61
COMMERCIAL	B	3.25	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.228
SUBAREA AREA(ACRES) = 9.52 SUBAREA RUNOFF(CFS) = 5.48
EFFECTIVE AREA(ACRES) = 45.55 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 45.5 PEAK FLOW RATE(CFS) = 21.71

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.73 HALFSTREET FLOOD WIDTH(FEET) = 23.18
FLOW VELOCITY(FEET/SEC.) = 1.34 DEPTH*VELOCITY(FT*FT/SEC.) = 0.98
LONGEST FLOWPATH FROM NODE 129.00 TO NODE 135.00 = 4193.00 FEET.

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 345.00 DOWNSTREAM ELEVATION(FEET) = 344.50
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.25
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.72
HALFSTREET FLOOD WIDTH(FEET) = 22.82
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.47
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.06
STREET FLOW TRAVEL TIME(MIN.) = 6.95 Tc(MIN.) = 60.54
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.736
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.94	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	4.44	0.69	0.600	61
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" B 0.01 0.69 0.500 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.401
 SUBAREA AREA (ACRES) = 7.39 SUBAREA RUNOFF(CFS) = 3.06
 EFFECTIVE AREA(ACRES) = 52.94 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 52.9 PEAK FLOW RATE(CFS) = 22.29

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 22.33
 FLOW VELOCITY(FEET/SEC.) = 1.45 DEPTH*VELOCITY(FT*FT/SEC.) = 1.03
 LONGEST FLOWPATH FROM NODE 129.00 TO NODE 136.00 = 4806.00 FEET.

FLOW PROCESS FROM NODE 136.00 TO NODE 136.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 60.54
 RAINFALL INTENSITY(INCH/HR) = 0.74
 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.39
 EFFECTIVE STREAM AREA(ACRES) = 52.94
 TOTAL STREAM AREA(ACRES) = 52.94
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 22.29

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	89.73	58.81	0.750	0.69(0.19)	0.28	170.8	113.00
2	22.29	60.54	0.736	0.69(0.27)	0.39	52.9	129.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 111.70 Tc(MIN.) = 58.81
 EFFECTIVE AREA(ACRES) = 221.51 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 237.3
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 136.00 = 8162.00 FEET.

FLOW PROCESS FROM NODE 136.00 TO NODE 139.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 344.50 DOWNSTREAM ELEVATION(FEET) = 340.00
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 113.30

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.92
 HALFSTREET FLOOD WIDTH(FEET) = 32.76
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.22
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.89
 STREET FLOW TRAVEL TIME(MIN.) = 3.86 Tc(MIN.) = 62.67
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.44	0.69	0.100	61
RESIDENTIAL					

"3-4 DWELLINGS/ACRE" B 2.15 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.263
 SUBAREA AREA(ACRES) = 6.59 SUBAREA RUNOFF(CFS) = 3.20
 EFFECTIVE AREA(ACRES) = 228.10 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 243.9 PEAK FLOW RATE(CFS) = 111.70
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.92 HALFSTREET FLOOD WIDTH(FEET) = 32.52
 FLOW VELOCITY(FEET/SEC.) = 4.21 DEPTH*VELOCITY(FT*FT/SEC.) = 3.86
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 139.00 = 9139.00 FEET.

FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 62.67
 RAINFALL INTENSITY(INCH/HR) = 0.72
 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.30
 EFFECTIVE STREAM AREA(ACRES) = 228.10
 TOTAL STREAM AREA(ACRES) = 243.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 111.70

FLOW PROCESS FROM NODE 137.00 TO NODE 138.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 341.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.537
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.860
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	6.88	0.69	0.100	61	14.54
COMMERCIAL	B	0.36	0.69	0.100	61	14.54
COMMERCIAL	B	4.97	0.69	0.100	61	14.54

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 19.68
 TOTAL AREA(ACRES) = 12.21 PEAK FLOW RATE(CFS) = 19.68

 FLOW PROCESS FROM NODE 138.00 TO NODE 139.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

 UPSTREAM ELEVATION(FEET) = 341.00 DOWNSTREAM ELEVATION(FEET) = 340.00
 STREET LENGTH(FEET) = 437.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.36
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.64
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.13
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.36
 STREET FLOW TRAVEL TIME(MIN.) = 3.42 Tc(MIN.) = 17.96

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.621
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	6.36	0.69	0.100	61
COMMERCIAL	B	0.74	0.69	0.100	61
COMMERCIAL	B	2.45	0.69	0.100	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 9.55 SUBAREA RUNOFF(CFS) = 13.34
 EFFECTIVE AREA(ACRES) = 21.76 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 21.8 PEAK FLOW RATE(CFS) = 30.40

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 20.13
 FLOW VELOCITY(FEET/SEC.) = 2.25 DEPTH*VELOCITY(FT*FT/SEC.) = 1.51
 LONGEST FLOWPATH FROM NODE 137.00 TO NODE 139.00 = 1437.00 FEET.

 FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.96
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.621
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.99	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	6.56	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.484
 SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 9.92
 EFFECTIVE AREA(ACRES) = 30.31 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.21
 TOTAL AREA(ACRES) = 30.3 PEAK FLOW RATE(CFS) = 40.32

 FLOW PROCESS FROM NODE 139.00 TO NODE 139.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.96
 RAINFALL INTENSITY(INCH/HR) = 1.62
 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.21
 EFFECTIVE STREAM AREA(ACRES) = 30.31
 TOTAL STREAM AREA(ACRES) = 30.31
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 40.32

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	111.70	62.67	0.719	0.69(0.21)	0.30	228.1	113.00
2	40.32	17.96	1.621	0.69(0.14)	0.21	30.3	137.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 127.42 Tc(MIN.) = 62.67
 EFFECTIVE AREA(ACRES) = 258.41 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.29
 TOTAL AREA(ACRES) = 274.2
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 139.00 = 9139.00 FEET.

 FLOW PROCESS FROM NODE 139.00 TO NODE 153.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 337.00

FLOW LENGTH(FEET) = 443.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.59
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 127.42
 PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 63.37
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 153.00 = 9582.00 FEET.

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

 FLOW PROCESS FROM NODE 140.00 TO NODE 141.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 344.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 19.181
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.553
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.04	0.69	0.100	61	19.18
COMMERCIAL	B	0.39	0.69	0.100	61	19.18
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	1.98	0.69	0.600	61	26.00
COMMERCIAL	B	3.92	0.69	0.100	61	19.18

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
 SUBAREA RUNOFF(CFS) = 9.18
 TOTAL AREA(ACRES) = 7.33 PEAK FLOW RATE(CFS) = 9.18

 FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 344.00 DOWNSTREAM ELEVATION(FEET) = 341.00
 STREET LENGTH(FEET) = 787.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.12

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.53
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.04
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.08
 STREET FLOW TRAVEL TIME(MIN.) = 6.43 Tc(MIN.) = 25.61
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.287

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.05	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	14.47	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.538
 SUBAREA AREA(ACRES) = 16.52 SUBAREA RUNOFF(CFS) = 13.65
 EFFECTIVE AREA(ACRES) = 23.85 AREA-AVERAGED Fm(INCH/HR) = 0.31
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.44
 TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 21.08

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 2.26 DEPTH*VELOCITY(FT*FT/SEC.) = 1.28
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 142.00 = 1787.00 FEET.

 FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 341.00 DOWNSTREAM ELEVATION(FEET) = 339.00
 STREET LENGTH(FEET) = 1194.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.17

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.67
 HALFSTREET FLOOD WIDTH(FEET) = 20.19
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.93
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.29
 STREET FLOW TRAVEL TIME(MIN.) = 10.31 Tc(MIN.) = 35.92
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.033

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.05	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	14.47	0.69	0.600	61

COMMERCIAL B 2.66 0.69 0.100 61
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 1.26 0.69 0.400 61
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 12.41 0.69 0.600 61
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.503
 SUBAREA AREA(ACRES) = 16.33 SUBAREA RUNOFF(CFS) = 10.11
 EFFECTIVE AREA(ACRES) = 40.18 AREA-AVERAGED Fm(INCH/HR) = 0.32
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.47
 TOTAL AREA(ACRES) = 40.2 PEAK FLOW RATE(CFS) = 25.73

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 20.01
 FLOW VELOCITY(FEET/SEC.) = 1.92 DEPTH*VELOCITY(FT*FT/SEC.) = 1.28
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 143.00 = 2981.00 FEET.

FLOW PROCESS FROM NODE 143.00 TO NODE 146.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 339.00 DOWNSTREAM(FEET) = 338.00
 FLOW LENGTH(FEET) = 740.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.92
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 25.73
 PIPE TRAVEL TIME(MIN.) = 3.14 Tc(MIN.) = 39.06
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 3721.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 39.06
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.978

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.00	0.69	0.100	61	22.03
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	B	0.32	0.69	0.400	61	28.19
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	7.54	0.69	0.600	61	35.01

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.536
 SUBAREA AREA(ACRES) = 8.86 SUBAREA RUNOFF(CFS) = 4.87
 EFFECTIVE AREA(ACRES) = 49.04 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 49.0 PEAK FLOW RATE(CFS) = 28.61

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 39.06
 RAINFALL INTENSITY(INCH/HR) = 0.98
 AREA-AVERAGED Fm(INCH/HR) = 0.33
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.48
 EFFECTIVE STREAM AREA(ACRES) = 49.04
 TOTAL STREAM AREA(ACRES) = 49.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 28.61

FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 344.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 22.033

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.419

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.24	0.69	0.100	61	22.03
COMMERCIAL	B	0.23	0.69	0.100	61	22.03
RESIDENTIAL						
"5-8 DWELLINGS/ACRE"	B	2.36	0.69	0.500	61	28.19
PUBLIC PARK	B	5.48	0.69	0.850	61	35.01
COMMERCIAL	B	0.69	0.69	0.100	61	22.03

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.605

SUBAREA RUNOFF(CFS) = 9.03

TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 9.03

FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 344.50 DOWNSTREAM ELEVATION(FEET) = 338.00
 STREET LENGTH(FEET) = 1321.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 18.95
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.08
STREET FLOW TRAVEL TIME(MIN.) = 10.20 Tc(MIN.) = 32.23
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.108
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.22	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	7.68	0.69	0.600	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.89	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.467
SUBAREA AREA(ACRES) = 15.79 SUBAREA RUNOFF(CFS) = 11.20
EFFECTIVE AREA(ACRES) = 25.79 AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 17.43

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.26 DEPTH*VELOCITY(FT*FT/SEC.) = 1.19
LONGEST FLOWPATH FROM NODE 144.00 TO NODE 146.00 = 2321.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 32.23
RAINFALL INTENSITY(INCH/HR) = 1.11
AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.52
EFFECTIVE STREAM AREA(ACRES) = 25.79
TOTAL STREAM AREA(ACRES) = 25.79
PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.43

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.61	39.06	0.978	0.69(0.33)	0.48	49.0	140.00
2	17.43	32.23	1.108	0.69(0.36)	0.52	25.8	144.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 43.02 Tc(MIN.) = 39.06
EFFECTIVE AREA(ACRES) = 74.83 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 74.8
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 3721.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 153.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 338.00 DOWNSTREAM(FEET) = 336.00
FLOW LENGTH(FEET) = 1379.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.51
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.02
PIPE TRAVEL TIME(MIN.) = 5.10 Tc(MIN.) = 44.16
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 153.00 = 5100.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 44.16
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.903
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.44	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	13.60	0.69	0.600	61
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.551
SUBAREA AREA(ACRES) = 15.24 SUBAREA RUNOFF(CFS) = 7.20
EFFECTIVE AREA(ACRES) = 90.07 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 90.1 PEAK FLOW RATE(CFS) = 45.17

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	45.17	44.16	0.903	0.69(0.35)	0.50	90.1	140.00

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 153.00 = 5100.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	127.42	63.37	0.714	0.69(0.20)	0.29	258.4	110.00

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 153.00 = 9582.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 157.28 Tc(MIN.) = 63.368
EFFECTIVE AREA(ACRES) = 348.48 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.35

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TOTAL AREA (ACRES) = 364.3
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 153.00 = 9582.00 FEET.
*****
FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 12
-----
>>>>CLEAR MEMORY BANK # 1 <<<<<
=====
*****
FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
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*****
FLOW PROCESS FROM NODE 147.00 TO NODE 148.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 341.50 DOWNSTREAM (FEET) = 341.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 22.033
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.419
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 6.90 0.69 0.100 61 22.03
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 5.21 0.69 0.400 61 27.11
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.335
SUBAREA RUNOFF (CFS) = 7.13
TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 7.13
*****
FLOW PROCESS FROM NODE 148.00 TO NODE 151.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION (FEET) = 341.00 DOWNSTREAM ELEVATION (FEET) = 340.50
STREET LENGTH (FEET) = 1213.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.70

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***STREET FLOWING FULL***
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.62
HALFSTREET FLOOD WIDTH (FEET) = 20.00
AVERAGE FLOW VELOCITY (FEET/SEC.) = 0.85
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.53
STREET FLOW TRAVEL TIME (MIN.) = 23.69 Tc (MIN.) = 45.72
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.883
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.90 0.69 0.100 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 5.06
EFFECTIVE AREA (ACRES) = 13.56 AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.22
TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 8.97

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.60 HALFSTREET FLOOD WIDTH (FEET) = 20.00
FLOW VELOCITY (FEET/SEC.) = 0.83 DEPTH*VELOCITY (FT*FT/SEC.) = 0.50
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 151.00 = 2213.00 FEET.
*****
FLOW PROCESS FROM NODE 151.00 TO NODE 151.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 45.72
RAINFALL INTENSITY (INCH/HR) = 0.88
AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.22
EFFECTIVE STREAM AREA (ACRES) = 13.56
TOTAL STREAM AREA (ACRES) = 13.56
PEAK FLOW RATE (CFS) AT CONFLUENCE = 8.97
*****
FLOW PROCESS FROM NODE 149.00 TO NODE 150.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 341.50 DOWNSTREAM (FEET) = 341.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 22.033
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.419
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.13 0.69 0.100 61 22.03
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.18 0.69 0.400 61 27.11

```

RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 4.84 0.69 0.600 61 29.86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.514
SUBAREA RUNOFF(CFS) = 7.82
TOTAL AREA (ACRES) = 8.15 PEAK FLOW RATE (CFS) = 7.82

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) =	341.00	DOWNSTREAM ELEVATION(FEET) =	340.50
STREET LENGTH(FEET) =	640.00	CURB HEIGHT(INCHES) =	8.0
STREET HALFWIDTH(FEET) =	20.00		

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.15

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.57
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.05
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.60
STREET FLOW TRAVEL TIME(MIN.) = 10.15 Tc(MIN.) = 32.18
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.97	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.97 SUBAREA RUNOFF(CFS) = 4.66
EFFECTIVE AREA(ACRES) = 13.12 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 13.1 PEAK FLOW RATE(CFS) = 10.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.05 DEPTH*VELOCITY(FT*FT/SEC.) = 0.60
LONGEST FLOWPATH FROM NODE 149.00 TO NODE 151.00 = 1640.00 FEET.

FLOW PROCESS FROM NODE 151.00 TO NODE 151.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 32.18
RAINFALL INTENSITY(INCH/HR) = 1.11
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.36
EFFECTIVE STREAM AREA(ACRES) = 13.12
TOTAL STREAM AREA(ACRES) = 13.12
PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.21

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	8.97	45.72	0.883	0.69(0.15)	0.22	13.6	147.00
2	10.21	32.18	1.109	0.69(0.25)	0.36	13.1	149.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 17.85 Tc(MIN.) = 32.18
EFFECTIVE AREA(ACRES) = 21.95 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 26.7
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 151.00 = 2213.00 FEET.

FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) =	340.50	DOWNSTREAM ELEVATION(FEET) =	340.00
STREET LENGTH(FEET) =	633.00	CURB HEIGHT(INCHES) =	8.0
STREET HALFWIDTH(FEET) =	20.00		

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.85

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.69
HALFSTREET FLOOD WIDTH(FEET) = 21.23
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.38
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.95
STREET FLOW TRAVEL TIME(MIN.) = 7.66 Tc(MIN.) = 39.84
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.966

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.96	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.96 SUBAREA RUNOFF(CFS) = 4.00

FLOW LENGTH(FEET) = 286.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.60
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 12.00
 PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 17.01
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 162.00 = 1286.00 FEET.

 FLOW PROCESS FROM NODE 162.00 TO NODE 162.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.01
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.679
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	0.07	0.93	0.100	39
COMMERCIAL	B	0.42	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	A	3.51	0.93	0.600	39
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	10.67	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583
 SUBAREA AREA(ACRES) = 14.67 SUBAREA RUNOFF(CFS) = 16.43
 EFFECTIVE AREA(ACRES) = 24.46 AREA-AVERAGED Fm(INCH/HR) = 0.42
 AREA-AVERAGED Fp(INCH/HR) = 0.73 AREA-AVERAGED Ap = 0.57
 TOTAL AREA(ACRES) = 24.5 PEAK FLOW RATE(CFS) = 27.81

 FLOW PROCESS FROM NODE 162.00 TO NODE 163.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 341.50 DOWNSTREAM(FEET) = 341.00
 FLOW LENGTH(FEET) = 873.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 2.91
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 27.81
 PIPE TRAVEL TIME(MIN.) = 4.99 Tc(MIN.) = 22.00
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 163.00 = 2159.00 FEET.

 FLOW PROCESS FROM NODE 163.00 TO NODE 163.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 22.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.421
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.41	0.69	0.100	61
RESIDENTIAL					

"3-4 DWELLINGS/ACRE" A 1.02 0.93 0.600 39
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 16.67 0.69 0.600 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.70
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.589
 SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 16.43
 EFFECTIVE AREA(ACRES) = 42.56 AREA-AVERAGED Fm(INCH/HR) = 0.41
 AREA-AVERAGED Fp(INCH/HR) = 0.72 AREA-AVERAGED Ap = 0.58
 TOTAL AREA(ACRES) = 42.6 PEAK FLOW RATE(CFS) = 38.54

 FLOW PROCESS FROM NODE 163.00 TO NODE 164.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 341.00 DOWNSTREAM(FEET) = 340.50
 FLOW LENGTH(FEET) = 609.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.54
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 38.54
 PIPE TRAVEL TIME(MIN.) = 2.87 Tc(MIN.) = 24.86
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 164.00 = 2768.00 FEET.

 FLOW PROCESS FROM NODE 164.00 TO NODE 164.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 24.86
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.312
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.34	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	17.90	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.591
 SUBAREA AREA(ACRES) = 18.24 SUBAREA RUNOFF(CFS) = 14.88
 EFFECTIVE AREA(ACRES) = 60.80 AREA-AVERAGED Fm(INCH/HR) = 0.41
 AREA-AVERAGED Fp(INCH/HR) = 0.71 AREA-AVERAGED Ap = 0.58
 TOTAL AREA(ACRES) = 60.8 PEAK FLOW RATE(CFS) = 49.26

 FLOW PROCESS FROM NODE 164.00 TO NODE 165.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.50 DOWNSTREAM(FEET) = 340.00
 FLOW LENGTH(FEET) = 488.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.12
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 49.26
 PIPE TRAVEL TIME(MIN.) = 1.98 Tc(MIN.) = 26.84

LONGEST FLOWPATH FROM NODE 160.00 TO NODE 165.00 = 3256.00 FEET.

FLOW PROCESS FROM NODE 165.00 TO NODE 165.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 26.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.248
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.26	0.69	0.100	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	14.44	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.591
 SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 11.15
 EFFECTIVE AREA(ACRES) = 75.50 AREA-AVERAGED Fm(INCH/HR) = 0.41
 AREA-AVERAGED Fp(INCH/HR) = 0.70 AREA-AVERAGED Ap = 0.58
 TOTAL AREA(ACRES) = 75.5 PEAK FLOW RATE(CFS) = 56.93

+-----+
 | END OF SYSTEM "G" |
 | |
 | |
 +-----+

FLOW PROCESS FROM NODE 170.00 TO NODE 171.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 341.50 DOWNSTREAM(FEET) = 340.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.687
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.637
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.21	0.69	0.100	61	17.69
COMMERCIAL	B	7.51	0.69	0.100	61	17.69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 12.31
 TOTAL AREA(ACRES) = 8.72 PEAK FLOW RATE(CFS) = 12.31

FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 339.50
FLOW LENGTH(FEET) = 832.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 2.43
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 12.31
 PIPE TRAVEL TIME(MIN.) = 5.70 Tc(MIN.) = 23.38
 LONGEST FLOWPATH FROM NODE 170.00 TO NODE 172.00 = 1832.00 FEET.

FLOW PROCESS FROM NODE 172.00 TO NODE 172.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.38
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.365
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.21	0.69	0.100	61
COMMERCIAL	B	11.64	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 11.85 SUBAREA RUNOFF(CFS) = 13.83
 EFFECTIVE AREA(ACRES) = 20.57 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 20.6 PEAK FLOW RATE(CFS) = 24.01

+-----+
 | END OF SYSTEM "H" |
 | |
 | |
 +-----+

FLOW PROCESS FROM NODE 175.00 TO NODE 177.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 331.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 45.920
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.881
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL GOOD COVER "ROW CROPS, STRAIGHT ROW"	A	6.18	0.60	1.000	67	45.92
AGRICULTURAL GOOD COVER "ROW CROPS, STRAIGHT ROW"	B	3.81	0.42	1.000	78	45.92
AGRICULTURAL GOOD COVER "ROW CROPS, STRAIGHT ROW"	A	4.50	0.60	1.000	67	45.92
AGRICULTURAL GOOD COVER "ROW CROPS, STRAIGHT ROW"	B	10.56	0.42	1.000	78	45.92

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.49
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 8.72

TOTAL AREA (ACRES) = 25.05 PEAK FLOW RATE (CFS) = 8.72

FLOW PROCESS FROM NODE 177.00 TO NODE 178.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 331.50 DOWNSTREAM(FEET) = 330.50
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.18
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.72
PIPE TRAVEL TIME(MIN.) = 3.42 Tc(MIN.) = 49.34
LONGEST FLOWPATH FROM NODE 175.00 TO NODE 178.00 = 1653.00 FEET.

FLOW PROCESS FROM NODE 178.00 TO NODE 178.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 49.34
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" A 5.16 0.60 1.000 67
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" B 16.03 0.42 1.000 78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.46
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 21.19 SUBAREA RUNOFF(CFS) = 7.25
EFFECTIVE AREA(ACRES) = 46.24 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.48 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 46.2 PEAK FLOW RATE(CFS) = 15.06

FLOW PROCESS FROM NODE 178.00 TO NODE 179.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 330.50 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 569.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.95
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.06
PIPE TRAVEL TIME(MIN.) = 3.21 Tc(MIN.) = 52.56
LONGEST FLOWPATH FROM NODE 175.00 TO NODE 179.00 = 2222.00 FEET.

FLOW PROCESS FROM NODE 179.00 TO NODE 179.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 52.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" A 8.17 0.60 1.000 67
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" B 22.14 0.42 1.000 78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.47
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 30.31 SUBAREA RUNOFF(CFS) = 9.32
EFFECTIVE AREA(ACRES) = 76.55 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.47 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 76.5 PEAK FLOW RATE(CFS) = 22.97

FLOW PROCESS FROM NODE 179.00 TO NODE 180.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 329.50
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.08
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.97
PIPE TRAVEL TIME(MIN.) = 3.57 Tc(MIN.) = 56.13
LONGEST FLOWPATH FROM NODE 175.00 TO NODE 180.00 = 2882.00 FEET.

FLOW PROCESS FROM NODE 180.00 TO NODE 180.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 56.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.773
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" A 20.59 0.60 1.000 67
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" B 18.99 0.42 1.000 78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.51
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 39.58 SUBAREA RUNOFF(CFS) = 9.34
EFFECTIVE AREA(ACRES) = 116.13 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.49 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 116.1 PEAK FLOW RATE(CFS) = 29.98

FLOW PROCESS FROM NODE 180.00 TO NODE 181.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 329.50 DOWNSTREAM(FEET) = 328.50
 FLOW LENGTH(FEET) = 684.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.23
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 29.98
 PIPE TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 58.82
 LONGEST FLOWPATH FROM NODE 175.00 TO NODE 181.00 = 3566.00 FEET.

FLOW PROCESS FROM NODE 181.00 TO NODE 181.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 58.82

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.750

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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AGRICULTURAL GOOD COVER

"ROW CROPS,STRAIGHT ROW" A 30.42 0.60 1.000 67

AGRICULTURAL GOOD COVER

"ROW CROPS,STRAIGHT ROW" B 9.76 0.42 1.000 78

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.55

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 40.18 SUBAREA RUNOFF(CFS) = 7.08

EFFECTIVE AREA(ACRES) = 156.31 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 156.3 PEAK FLOW RATE(CFS) = 34.64

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 | END OF SYSTEM "I1" |
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FLOW PROCESS FROM NODE 190.00 TO NODE 191.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00

ELEVATION DATA: UPSTREAM(FEET) = 329.50 DOWNSTREAM(FEET) = 325.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 44.709

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.896

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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AGRICULTURAL GOOD COVER

"ROW CROPS,STRAIGHT ROW" A 9.99 0.60 1.000 67 44.71

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF(CFS) = 2.68

TOTAL AREA(ACRES) = 9.99 PEAK FLOW RATE(CFS) = 2.68

FLOW PROCESS FROM NODE 191.00 TO NODE 192.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 325.50 DOWNSTREAM(FEET) = 324.50

FLOW LENGTH(FEET) = 853.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 2.14

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 2.68

PIPE TRAVEL TIME(MIN.) = 6.64 Tc(MIN.) = 51.35

LONGEST FLOWPATH FROM NODE 190.00 TO NODE 192.00 = 1853.00 FEET.

FLOW PROCESS FROM NODE 192.00 TO NODE 192.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 51.35

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.819

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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AGRICULTURAL GOOD COVER

"ROW CROPS,STRAIGHT ROW" A 14.08 0.60 1.000 67

COMMERCIAL A 0.92 0.93 0.100 39

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.945

SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 3.40

EFFECTIVE AREA(ACRES) = 24.99 AREA-AVERAGED Fm(INCH/HR) = 0.58

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 25.0 PEAK FLOW RATE(CFS) = 5.38

FLOW PROCESS FROM NODE 192.00 TO NODE 193.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 324.50 DOWNSTREAM(FEET) = 323.50

FLOW LENGTH(FEET) = 558.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 2.97

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 5.38

PIPE TRAVEL TIME(MIN.) = 3.13 Tc(MIN.) = 54.49

LONGEST FLOWPATH FROM NODE 190.00 TO NODE 193.00 = 2411.00 FEET.

FLOW PROCESS FROM NODE 193.00 TO NODE 193.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 54.49

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.788

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 AGRICULTURAL GOOD COVER
 "ROW CROPS, STRAIGHT ROW" A 16.68 0.60 1.000 67
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA (ACRES) = 16.68 SUBAREA RUNOFF (CFS) = 2.85
 EFFECTIVE AREA (ACRES) = 41.67 AREA-AVERAGED Fm (INCH/HR) = 0.59
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
 TOTAL AREA (ACRES) = 41.7 PEAK FLOW RATE (CFS) = 7.54

 FLOW PROCESS FROM NODE 193.00 TO NODE 194.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 323.50 DOWNSTREAM (FEET) = 321.50
 FLOW LENGTH (FEET) = 606.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.04
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 7.54
 PIPE TRAVEL TIME (MIN.) = 2.50 Tc (MIN.) = 56.98
 LONGEST FLOWPATH FROM NODE 190.00 TO NODE 194.00 = 3017.00 FEET.

 FLOW PROCESS FROM NODE 194.00 TO NODE 194.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 56.98
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.765
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 AGRICULTURAL GOOD COVER
 "ROW CROPS, STRAIGHT ROW" A 18.12 0.60 1.000 67
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA (ACRES) = 18.12 SUBAREA RUNOFF (CFS) = 2.73
 EFFECTIVE AREA (ACRES) = 59.79 AREA-AVERAGED Fm (INCH/HR) = 0.59
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
 TOTAL AREA (ACRES) = 59.8 PEAK FLOW RATE (CFS) = 9.42

 FLOW PROCESS FROM NODE 194.00 TO NODE 195.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 321.50 DOWNSTREAM (FEET) = 320.00
 FLOW LENGTH (FEET) = 606.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.84
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 9.42
 PIPE TRAVEL TIME (MIN.) = 2.63 Tc (MIN.) = 59.62

LONGEST FLOWPATH FROM NODE 190.00 TO NODE 195.00 = 3623.00 FEET.

 FLOW PROCESS FROM NODE 195.00 TO NODE 195.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 59.62
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.743
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 AGRICULTURAL GOOD COVER
 "ROW CROPS, STRAIGHT ROW" A 18.27 0.60 1.000 67
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA (ACRES) = 18.27 SUBAREA RUNOFF (CFS) = 2.39
 EFFECTIVE AREA (ACRES) = 78.06 AREA-AVERAGED Fm (INCH/HR) = 0.59
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
 TOTAL AREA (ACRES) = 78.1 PEAK FLOW RATE (CFS) = 10.61

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 | END OF SYSTEM "I2" |
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 FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
 ELEVATION DATA: UPSTREAM (FEET) = 365.00 DOWNSTREAM (FEET) = 362.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 15.397
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.791
 SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL B 0.03 0.69 0.100 61 15.40
 COMMERCIAL B 9.96 0.69 0.100 61 15.40
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 15.49
 TOTAL AREA (ACRES) = 9.99 PEAK FLOW RATE (CFS) = 15.49

 FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 362.00 DOWNSTREAM ELEVATION (FEET) = 360.00
 STREET LENGTH (FEET) = 732.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.03
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.62
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.35
STREET FLOW TRAVEL TIME(MIN.) = 5.56 Tc(MIN.) = 20.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.466

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.12 0.69 0.100 61
COMMERCIAL B 14.97 0.69 0.100 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 15.09 SUBAREA RUNOFF(CFS) = 18.98
EFFECTIVE AREA(ACRES) = 25.08 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 31.54

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.40 DEPTH*VELOCITY(FT*FT/SEC.) = 1.59
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 1732.00 FEET.

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 360.00 DOWNSTREAM ELEVATION(FEET) = 359.50
STREET LENGTH(FEET) = 1148.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.90
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.98
HALFSTREET FLOOD WIDTH(FEET) = 35.82
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.33
STREET FLOW TRAVEL TIME(MIN.) = 14.19 Tc(MIN.) = 35.15
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.048
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.22 0.69 0.100 61
COMMERCIAL B 21.17 0.69 0.100 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 23.39 SUBAREA RUNOFF(CFS) = 20.61
EFFECTIVE AREA(ACRES) = 48.47 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 48.5 PEAK FLOW RATE(CFS) = 42.71

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.99 HALFSTREET FLOOD WIDTH(FEET) = 36.18
FLOW VELOCITY(FEET/SEC.) = 1.35 DEPTH*VELOCITY(FT*FT/SEC.) = 1.34
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1148.0 FT WITH ELEVATION-DROP = 0.5 FT, IS 26.9 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 203.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 2880.00 FEET.

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 359.50 DOWNSTREAM ELEVATION(FEET) = 355.00
STREET LENGTH(FEET) = 1481.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 46.44
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.73
HALFSTREET FLOOD WIDTH(FEET) = 23.24
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.86
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.10
STREET FLOW TRAVEL TIME(MIN.) = 8.62 Tc(MIN.) = 43.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 4.09 0.69 0.100 61

RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 8.56 0.69 0.500 61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.371
 SUBAREA AREA(ACRES) = 12.65 SUBAREA RUNOFF(CFS) = 7.45
 EFFECTIVE AREA(ACRES) = 61.12 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.16
 TOTAL AREA(ACRES) = 61.1 PEAK FLOW RATE(CFS) = 44.09

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.72 HALFSTREET FLOOD WIDTH(FEET) = 22.63
 FLOW VELOCITY(FEET/SEC.) = 2.82 DEPTH*VELOCITY(FT*FT/SEC.) = 2.03
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 4361.00 FEET.

 FLOW PROCESS FROM NODE 204.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 352.50
 STREET LENGTH(FEET) = 1197.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.49

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.77
 HALFSTREET FLOOD WIDTH(FEET) = 25.32
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.50
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.93
 STREET FLOW TRAVEL TIME(MIN.) = 7.99 Tc(MIN.) = 51.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.815

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	1.90	0.69	0.100	61	16.70
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	3.61	0.69	0.500	61	22.63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.362
 SUBAREA AREA(ACRES) = 5.51 SUBAREA RUNOFF(CFS) = 2.81
 EFFECTIVE AREA(ACRES) = 66.63 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.17
 TOTAL AREA(ACRES) = 66.6 PEAK FLOW RATE(CFS) = 44.09
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.76 HALFSTREET FLOOD WIDTH(FEET) = 24.89

FLOW VELOCITY(FEET/SEC.) = 2.48 DEPTH*VELOCITY(FT*FT/SEC.) = 1.89
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 216.00 = 5558.00 FEET.

 FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
 =====

 FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 363.00 DOWNSTREAM(FEET) = 361.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.698
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.699
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	3.58	0.69	0.100	61	16.70
RESIDENTIAL						
"3-5 DWELLINGS/ACRE"	B	4.89	0.69	0.600	61	22.63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.389
 SUBAREA RUNOFF(CFS) = 10.92
 TOTAL AREA(ACRES) = 8.47 PEAK FLOW RATE(CFS) = 10.92

 FLOW PROCESS FROM NODE 206.00 TO NODE 209.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 361.00 DOWNSTREAM ELEVATION(FEET) = 359.00
 STREET LENGTH(FEET) = 1280.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.27

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.59
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.57
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.93

STREET FLOW TRAVEL TIME(MIN.) = 13.62 Tc(MIN.) = 30.32
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.153
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.78	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	8.59	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
 SUBAREA AREA(ACRES) = 13.37 SUBAREA RUNOFF(CFS) = 10.40
 EFFECTIVE AREA(ACRES) = 21.84 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 21.8 PEAK FLOW RATE(CFS) = 17.16

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.60 DEPTH*VELOCITY(FT*FT/SEC.) = 0.96
 LONGEST FLOWPATH FROM NODE 205.00 TO NODE 209.00 = 2280.00 FEET.

 FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 30.32
 RAINFALL INTENSITY(INCH/HR) = 1.15
 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.41
 EFFECTIVE STREAM AREA(ACRES) = 21.84
 TOTAL STREAM AREA(ACRES) = 21.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.16

 FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 367.50 DOWNSTREAM(FEET) = 362.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.640
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.938
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL GOOD COVER						
"ORCHARDS"	B	7.44	0.72	1.000	58	41.95
AGRICULTURAL GOOD COVER						
"ORCHARDS"	C	2.42	0.52	1.000	72	41.95
COMMERCIAL	B	0.14	0.69	0.100	61	13.64

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987

SUBAREA RUNOFF(CFS) = 11.46
 TOTAL AREA(ACRES) = 10.00 PEAK FLOW RATE(CFS) = 11.46

 FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 362.00 DOWNSTREAM ELEVATION(FEET) = 359.00
 STREET LENGTH(FEET) = 806.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.82
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.51
 HALFSTREET FLOOD WIDTH(FEET) = 19.49
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.93
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
 STREET FLOW TRAVEL TIME(MIN.) = 6.97 Tc(MIN.) = 20.61
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.482

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
AGRICULTURAL GOOD COVER					
"ORCHARDS"	B	0.58	0.72	1.000	58
COMMERCIAL	B	2.22	0.69	0.100	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.56	0.69	0.600	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.70
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.399
 SUBAREA AREA(ACRES) = 4.36 SUBAREA RUNOFF(CFS) = 4.72
 EFFECTIVE AREA(ACRES) = 14.36 AREA-AVERAGED Fm(INCH/HR) = 0.55
 AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.81
 TOTAL AREA(ACRES) = 14.4 PEAK FLOW RATE(CFS) = 12.08

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.48
 FLOW VELOCITY(FEET/SEC.) = 1.86 DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
 LONGEST FLOWPATH FROM NODE 207.00 TO NODE 209.00 = 1806.00 FEET.

 FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 20.61
 RAINFALL INTENSITY(INCH/HR) = 1.48
 AREA-AVERAGED Fm(INCH/HR) = 0.55
 AREA-AVERAGED Fp(INCH/HR) = 0.68
 AREA-AVERAGED Ap = 0.81
 EFFECTIVE STREAM AREA(ACRES) = 14.36
 TOTAL STREAM AREA(ACRES) = 14.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.08

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	17.16	30.32	1.153	0.69(0.28)	0.41	21.8	205.00
2	12.08	20.61	1.482	0.68(0.55)	0.81	14.4	207.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 24.98 Tc(MIN.) = 30.32
 EFFECTIVE AREA(ACRES) = 36.20 AREA-AVERAGED Fm(INCH/HR) = 0.39
 AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.57
 TOTAL AREA(ACRES) = 36.2
 LONGEST FLOWPATH FROM NODE 205.00 TO NODE 209.00 = 2280.00 FEET.

FLOW PROCESS FROM NODE 209.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 350.00
 STREET LENGTH(FEET) = 1281.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.30

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.58
 HALfstREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.19
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.84
 STREET FLOW TRAVEL TIME(MIN.) = 6.69 Tc(MIN.) = 37.01
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.013

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
AGRICULTURAL GOOD COVER "ORCHARDS"	B	1.87	0.72	1.000	58
AGRICULTURAL GOOD COVER "ORCHARDS"	C	3.90	0.52	1.000	72
COMMERCIAL	B	6.81	0.69	0.100	61

COMMERCIAL	C	0.96	0.49	0.100	74
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	3.44	0.69	0.600	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	3.17	0.69	0.500	61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.63					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.506					
SUBAREA AREA(ACRES) = 20.15 SUBAREA RUNOFF(CFS) = 12.62					
EFFECTIVE AREA(ACRES) = 56.35 AREA-AVERAGED Fm(INCH/HR) = 0.36					
AREA-AVERAGED Fp(INCH/HR) = 0.66 AREA-AVERAGED Ap = 0.55					
TOTAL AREA(ACRES) = 56.3 PEAK FLOW RATE(CFS) = 33.04					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALfstREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 3.26 DEPTH*VELOCITY(FT*FT/SEC.) = 1.91
 LONGEST FLOWPATH FROM NODE 205.00 TO NODE 215.00 = 3561.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 361.00 DOWNSTREAM(FEET) = 359.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 17.687
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.637
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	2.35	0.69	0.100	61	17.69
RESIDENTIAL "5-8 DWELLINGS/ACRE"	B	3.98	0.69	0.500	61	22.63
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.352						
SUBAREA RUNOFF(CFS) = 7.95						
TOTAL AREA(ACRES) = 6.33 PEAK FLOW RATE(CFS) = 7.95						

FLOW PROCESS FROM NODE 211.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 359.50 DOWNSTREAM ELEVATION(FEET) = 357.00
 STREET LENGTH(FEET) = 813.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.12
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 18.55
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.70
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.84
STREET FLOW TRAVEL TIME(MIN.) = 7.97 Tc(MIN.) = 25.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.286

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.08 0.69 0.100 61
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 4.74 0.69 0.500 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.378
SUBAREA AREA(ACRES) = 6.82 SUBAREA RUNOFF(CFS) = 6.30
EFFECTIVE AREA(ACRES) = 13.15 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 13.1 PEAK FLOW RATE(CFS) = 12.25

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.34
FLOW VELOCITY(FEET/SEC.) = 1.73 DEPTH*VELOCITY(FT*FT/SEC.) = 0.88
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1813.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 25.65
RAINFALL INTENSITY(INCH/HR) = 1.29
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.37
EFFECTIVE STREAM AREA(ACRES) = 13.15
TOTAL STREAM AREA(ACRES) = 13.15
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.25

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 359.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 19.181
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.553
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 3.33 0.69 0.100 61 19.18
RESIDENTIAL
"5-8 DWELLINGS/ACRE" B 6.12 0.69 0.500 61 24.54
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.359
SUBAREA RUNOFF(CFS) = 11.11
TOTAL AREA(ACRES) = 9.45 PEAK FLOW RATE(CFS) = 11.11

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 359.00 DOWNSTREAM ELEVATION(FEET) = 357.00
STREET LENGTH(FEET) = 673.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.29
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.53
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.80
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.95
STREET FLOW TRAVEL TIME(MIN.) = 6.24 Tc(MIN.) = 25.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.293

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.07 0.69 0.100 61
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 4.73 0.69 0.500 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.378
SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 6.33
EFFECTIVE AREA(ACRES) = 16.25 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 16.2 PEAK FLOW RATE(CFS) = 15.23

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.85 DEPTH*VELOCITY(FT*FT/SEC.) = 0.99

LONGEST FLOWPATH FROM NODE 212.00 TO NODE 214.00 = 1673.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 25.42
RAINFALL INTENSITY(INCH/HR) = 1.29
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69
AREA-AVERAGED Ap = 0.37
EFFECTIVE STREAM AREA(ACRES) = 16.25
TOTAL STREAM AREA(ACRES) = 16.25
PEAK FLOW RATE(CFS) AT CONFLUENCE = 15.23

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 2 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 27.42 Tc(MIN.) = 25.42
EFFECTIVE AREA(ACRES) = 29.24 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 29.4
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1813.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 357.00 DOWNSTREAM ELEVATION(FEET) = 355.00
STREET LENGTH(FEET) = 1310.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.29
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.73
HALFSTREET FLOOD WIDTH(FEET) = 23.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.02
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.47

STREET FLOW TRAVEL TIME(MIN.) = 10.81 Tc(MIN.) = 36.23

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Contains data for Commercial and Residential areas.

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 22.21
FLOW VELOCITY(FEET/SEC.) = 1.97 DEPTH*VELOCITY(FT*FT/SEC.) = 1.40
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3123.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 1 row of data.

** MEMORY BANK # 2 CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 1 row of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 62.60 Tc(MIN.) = 37.008
EFFECTIVE AREA(ACRES) = 99.78 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.67 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 99.9
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 215.00 = 3561.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 352.50

STREET LENGTH(FEET) = 714.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 64.35
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.80
HALFSTREET FLOOD WIDTH(FEET) = 26.48
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.31
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.64
STREET FLOW TRAVEL TIME(MIN.) = 3.59 Tc(MIN.) = 40.60
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.954
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.89 0.69 0.100 61
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 3.61 0.69 0.500 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.363
SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 3.49
EFFECTIVE AREA(ACRES) = 105.28 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.67 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 105.4 PEAK FLOW RATE(CFS) = 62.60
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.79 HALFSTREET FLOOD WIDTH(FEET) = 26.11
FLOW VELOCITY(FEET/SEC.) = 3.29 DEPTH*VELOCITY(FT*FT/SEC.) = 2.59
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 216.00 = 4275.00 FEET.

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 62.60 40.60 0.954 0.67(0.31) 0.47 105.3 205.00
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 216.00 = 4275.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 44.09 51.76 0.815 0.69(0.12) 0.17 66.6 200.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 216.00 = 5558.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 101.94 Tc(MIN.) = 40.602
EFFECTIVE AREA(ACRES) = 154.82 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.67 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 172.1
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 216.00 = 5558.00 FEET.

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 216.00 TO NODE 227.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 352.50 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 825.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.36
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.94
PIPE TRAVEL TIME(MIN.) = 1.87 Tc(MIN.) = 42.47
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 227.00 = 6383.00 FEET.

FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 359.00 DOWNSTREAM(FEET) = 355.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.537
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.860
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 5.00 0.69 0.100 61 14.54
RESIDENTIAL
"5-8 DWELLINGS/ACRE" B 0.31 0.69 0.500 61 18.60
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.123
SUBAREA RUNOFF(CFS) = 8.48
TOTAL AREA(ACRES) = 5.31 PEAK FLOW RATE(CFS) = 8.48

FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 353.00
STREET LENGTH(FEET) = 1253.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.45
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.41
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.78
STREET FLOW TRAVEL TIME(MIN.) = 14.80 Tc(MIN.) = 29.34
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.178

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.09 0.69 0.100 61
RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 7.34 0.69 0.500 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.411

SUBAREA AREA(ACRES) = 9.43 SUBAREA RUNOFF(CFS) = 7.60

EFFECTIVE AREA(ACRES) = 14.74 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 14.7 PEAK FLOW RATE(CFS) = 12.83

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 1.43 DEPTH*VELOCITY(FT*FT/SEC.) = 0.79
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 222.00 = 2253.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 353.00 DOWNSTREAM ELEVATION(FEET) = 350.50
STREET LENGTH(FEET) = 668.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.01

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.52
HALFSTREET FLOOD WIDTH(FEET) = 20.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.97
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.03
STREET FLOW TRAVEL TIME(MIN.) = 5.64 Tc(MIN.) = 34.98
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.28 0.69 0.100 61
RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 1.04 0.69 0.400 61
RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 3.92 0.69 0.500 61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.401

SUBAREA AREA(ACRES) = 6.24 SUBAREA RUNOFF(CFS) = 4.36

EFFECTIVE AREA(ACRES) = 20.98 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.34

TOTAL AREA(ACRES) = 21.0 PEAK FLOW RATE(CFS) = 15.50

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.00
FLOW VELOCITY(FEET/SEC.) = 2.00 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 223.00 = 2921.00 FEET.

FLOW PROCESS FROM NODE 223.00 TO NODE 227.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 350.50 DOWNSTREAM ELEVATION(FEET) = 350.00
STREET LENGTH(FEET) = 508.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.01

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.65

HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.41
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.92
 STREET FLOW TRAVEL TIME(MIN.) = 5.98 Tc(MIN.) = 40.96
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.948
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.63	0.69	0.100	61
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.92	0.69	0.400	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	1.66	0.69	0.600	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.35	0.69	0.500	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.432
 SUBAREA AREA(ACRES) = 8.56 SUBAREA RUNOFF(CFS) = 5.02
 EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 18.58

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 1.43 DEPTH*VELOCITY(FT*FT/SEC.) = 0.94
 LONGEST FLOWPATH FROM NODE 220.00 TO NODE 227.00 = 3429.00 FEET.

 FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
 =====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	18.58	40.96	0.948	0.69(0.25)	0.36	29.5	220.00

LONGEST FLOWPATH FROM NODE 220.00 TO NODE 227.00 = 3429.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	101.94	42.47	0.926	0.67(0.25)	0.37	154.8	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 227.00 = 6383.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 119.93 Tc(MIN.) = 42.469
 EFFECTIVE AREA(ACRES) = 184.36 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 201.6
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 227.00 = 6383.00 FEET.

 FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
 =====

 FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 42.47
 RAINFALL INTENSITY(INCH/HR) = 0.93
 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.68
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 184.36
 TOTAL STREAM AREA(ACRES) = 201.61
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 119.93

 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 355.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.902
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	4.94	0.69	0.100	61	13.90
COMMERCIAL	B	2.04	0.69	0.100	61	13.90
RESIDENTIAL "5-8 DWELLINGS/ACRE"	B	2.91	0.69	0.500	61	17.79

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.218
 SUBAREA RUNOFF(CFS) = 15.71
 TOTAL AREA(ACRES) = 9.89 PEAK FLOW RATE(CFS) = 15.71

 FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 355.00 DOWNSTREAM ELEVATION(FEET) = 354.50
 STREET LENGTH(FEET) = 912.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.66
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.77
 HALFSTREET FLOOD WIDTH(FEET) = 24.95
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.27
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.97
 STREET FLOW TRAVEL TIME(MIN.) = 11.98 Tc(MIN.) = 25.88
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.278
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.74	0.69	0.100	61
COMMERCIAL	B	5.59	0.69	0.100	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	5.48	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.237
 SUBAREA AREA(ACRES) = 19.22 SUBAREA RUNOFF(CFS) = 15.51
 EFFECTIVE AREA(ACRES) = 42.92 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.24
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 23.73

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.78 HALFSTREET FLOOD WIDTH(FEET) = 25.50
 FLOW VELOCITY(FEET/SEC.) = 1.29 DEPTH*VELOCITY(FT*FT/SEC.) = 1.00
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 912.0 FT WITH ELEVATION-DROP = 0.5 FT, IS 16.1 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 226.00
 LONGEST FLOWPATH FROM NODE 224.00 TO NODE 226.00 = 1912.00 FEET.

 FLOW PROCESS FROM NODE 226.00 TO NODE 227.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION(FEET) = 354.50 DOWNSTREAM ELEVATION(FEET) = 350.00
 STREET LENGTH(FEET) = 1336.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.51
 STREET FLOWING FULL
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.64
 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.56
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.64

STREET FLOW TRAVEL TIME(MIN.) = 8.69 Tc(MIN.) = 34.57
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.059
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.78	0.69	0.100	61
COMMERCIAL	B	1.55	0.69	0.100	61
COMMERCIAL	B	8.33	0.69	0.100	61
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	6.56	0.69	0.500	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.237
 SUBAREA AREA(ACRES) = 19.22 SUBAREA RUNOFF(CFS) = 15.51
 EFFECTIVE AREA(ACRES) = 42.92 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.24
 TOTAL AREA(ACRES) = 42.9 PEAK FLOW RATE(CFS) = 34.56

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 20.00
 FLOW VELOCITY(FEET/SEC.) = 2.65 DEPTH*VELOCITY(FT*FT/SEC.) = 1.74
 LONGEST FLOWPATH FROM NODE 224.00 TO NODE 227.00 = 3248.00 FEET.

 FLOW PROCESS FROM NODE 227.00 TO NODE 227.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 34.57
 RAINFALL INTENSITY(INCH/HR) = 1.06
 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.24
 EFFECTIVE STREAM AREA(ACRES) = 42.92
 TOTAL STREAM AREA(ACRES) = 42.92
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 34.56

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	119.93	42.47	0.926	0.68(0.25)	0.37	184.4	200.00
2	34.56	34.57	1.059	0.69(0.16)	0.24	42.9	224.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 149.38 Tc(MIN.) = 42.47
 EFFECTIVE AREA(ACRES) = 227.28 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 244.5
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 227.00 = 6383.00 FEET.

 FLOW PROCESS FROM NODE 227.00 TO NODE 236.00 IS CODE = 51

 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 498.00 CHANNEL SLOPE = 0.0201
CHANNEL BASE(FEET) = 3.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.918

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.93	0.69	0.100	61
COMMERCIAL	B	3.09	0.69	0.100	61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 151.30

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.22

AVERAGE FLOW DEPTH(FEET) = 1.68 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 43.05

SUBAREA AREA(ACRES) = 5.02 SUBAREA RUNOFF(CFS) = 3.84

EFFECTIVE AREA(ACRES) = 232.30 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.34

TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 149.38

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.67 FLOW VELOCITY(FEET/SEC.) = 14.13

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00

ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 352.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.397

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.791

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.51	0.69	0.100	61	15.40
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	B	1.30	0.69	0.400	61	18.94
SCHOOL	B	4.92	0.69	0.600	61	20.87

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.523

SUBAREA RUNOFF(CFS) = 8.68

TOTAL AREA(ACRES) = 6.73 PEAK FLOW RATE(CFS) = 8.68

FLOW PROCESS FROM NODE 231.00 TO NODE 233.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 352.00 DOWNSTREAM ELEVATION(FEET) = 350.00

STREET LENGTH(FEET) = 575.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.64

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.52

HALFSTREET FLOOD WIDTH(FEET) = 20.00

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.91

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.00

STREET FLOW TRAVEL TIME(MIN.) = 5.01 Tc(MIN.) = 20.41

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.492

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.21	0.69	0.100	61
PUBLIC PARK	B	4.03	0.69	0.850	61
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.71	0.69	0.400	61
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.33	0.69	0.600	61
SCHOOL	B	5.04	0.69	0.600	61

RESIDENTIAL

"8-10 DWELLINGS/ACRE"

RESIDENTIAL

"3-4 DWELLINGS/ACRE"

SCHOOL

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.621

SUBAREA AREA(ACRES) = 12.32 SUBAREA RUNOFF(CFS) = 11.82

EFFECTIVE AREA(ACRES) = 19.05 AREA-AVERAGED Fm(INCH/HR) = 0.40

AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 19.0 PEAK FLOW RATE(CFS) = 18.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 2.10 DEPTH*VELOCITY(FT*FT/SEC.) = 1.16

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1575.00 FEET.

FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 20.41

RAINFALL INTENSITY(INCH/HR) = 1.49

AREA-AVERAGED Fm(INCH/HR) = 0.40

AREA-AVERAGED Fp (INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.59
 EFFECTIVE STREAM AREA (ACRES) = 19.05
 TOTAL STREAM AREA (ACRES) = 19.05
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 18.68

 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 841.00
 ELEVATION DATA: UPSTREAM (FEET) = 351.00 DOWNSTREAM (FEET) = 350.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 17.288
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.661

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.86	0.69	0.100	61	17.29
PUBLIC PARK	B	5.87	0.69	0.850	61	27.47
RESIDENTIAL "3-5 DWELLINGS/ACRE"	B	1.76	0.69	0.600	61	23.43

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.722
 SUBAREA RUNOFF (CFS) = 8.91
 TOTAL AREA (ACRES) = 8.49 PEAK FLOW RATE (CFS) = 8.91

 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.29
 RAINFALL INTENSITY (INCH/HR) = 1.66
 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.69
 AREA-AVERAGED Ap = 0.72
 EFFECTIVE STREAM AREA (ACRES) = 8.49
 TOTAL STREAM AREA (ACRES) = 8.49
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 8.91

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.68	20.41	1.492	0.69 (0.40)	0.59	19.0	230.00
2	8.91	17.29	1.661	0.69 (0.50)	0.72	8.5	232.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 26.29 Tc (MIN.) = 20.41
 EFFECTIVE AREA (ACRES) = 27.54 AREA-AVERAGED Fm (INCH/HR) = 0.43
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.63
 TOTAL AREA (ACRES) = 27.5

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1575.00 FEET.

 FLOW PROCESS FROM NODE 233.00 TO NODE 236.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 350.00 DOWNSTREAM ELEVATION (FEET) = 340.00
 STREET LENGTH (FEET) = 871.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.81

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.54
 HALFSTREET FLOOD WIDTH (FEET) = 20.00
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.73
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.03
 STREET FLOW TRAVEL TIME (MIN.) = 3.89 Tc (MIN.) = 24.30
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.332

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.23	0.69	0.100	61
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.78	0.69	0.400	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	7.38	0.69	0.600	61
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	0.62	0.69	0.600	61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.69
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.453
 SUBAREA AREA (ACRES) = 12.01 SUBAREA RUNOFF (CFS) = 11.04
 EFFECTIVE AREA (ACRES) = 39.55 AREA-AVERAGED Fm (INCH/HR) = 0.39
 AREA-AVERAGED Fp (INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.58
 TOTAL AREA (ACRES) = 39.5 PEAK FLOW RATE (CFS) = 33.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 20.00
 FLOW VELOCITY (FEET/SEC.) = 3.80 DEPTH*VELOCITY (FT*FT/SEC.) = 2.09
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 2446.00 FEET.

 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 33.36 24.30 1.332 0.69(0.39) 0.58 39.5 230.00
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 2446.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 149.38 43.05 0.918 0.68(0.23) 0.34 232.3 200.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 168.02 Tc(MIN.) = 43.053
EFFECTIVE AREA(ACRES) = 271.85 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 289.1
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<<

FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 895.00
ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 345.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.969
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.908

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 2.28 0.69 0.100 61 13.97
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 4.15 0.69 0.600 61 18.93
RESIDENTIAL
"3-5 DWELLINGS/ACRE" B 3.69 0.69 0.600 61 18.93

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.487
SUBAREA RUNOFF(CFS) = 14.34
TOTAL AREA(ACRES) = 10.12 PEAK FLOW RATE(CFS) = 14.34

FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 377.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.05
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.34
PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 14.75
LONGEST FLOWPATH FROM NODE 234.00 TO NODE 236.00 = 1272.00 FEET.

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 14.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.842
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 13.25 0.69 0.100 61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 13.25 SUBAREA RUNOFF(CFS) = 21.15
EFFECTIVE AREA(ACRES) = 23.37 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.27
TOTAL AREA(ACRES) = 23.4 PEAK FLOW RATE(CFS) = 34.88

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 34.88 14.75 1.842 0.69(0.18) 0.27 23.4 234.00
LONGEST FLOWPATH FROM NODE 234.00 TO NODE 236.00 = 1272.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 168.02 43.05 0.918 0.68(0.25) 0.37 271.8 200.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 183.47 Tc(MIN.) = 43.053
EFFECTIVE AREA(ACRES) = 295.22 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.68 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 312.5
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 236.00 = 6881.00 FEET.

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 12

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>>>>CLEAR MEMORY BANK # 1 <<<<<
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+-----+
| END OF SYSTEM "J" |
| |
| |
+-----+
*****
FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
ELEVATION DATA: UPSTREAM(FEET) = 349.00 DOWNSTREAM(FEET) = 345.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.537
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.860
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.80 0.69 0.100 61 14.54
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 14.22 0.69 0.600 61 19.70
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.573
SUBAREA AREA(ACRES) = 15.02 SUBAREA RUNOFF(CFS) = 10.73
EFFECTIVE AREA(ACRES) = 24.35 AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 24.4 PEAK FLOW RATE(CFS) = 17.65

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.72 HALFSTREET FLOOD WIDTH(FEET) = 22.45
FLOW VELOCITY(FEET/SEC.) = 1.14 DEPTH*VELOCITY(FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 240.00 TO NODE 242.00 = 1997.00 FEET.

*****
FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 344.50 DOWNSTREAM ELEVATION(FEET) = 344.00
STREET LENGTH(FEET) = 943.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.12
***STREET FLOWING FULL***
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.72
HALFSTREET FLOOD WIDTH(FEET) = 22.75
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.15

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PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.83
STREET FLOW TRAVEL TIME(MIN.) = 14.46 Tc(MIN.) = 29.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.187
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.80 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 14.22 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.573
SUBAREA AREA(ACRES) = 15.02 SUBAREA RUNOFF(CFS) = 10.73
EFFECTIVE AREA(ACRES) = 24.35 AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 24.4 PEAK FLOW RATE(CFS) = 17.65

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.72 HALFSTREET FLOOD WIDTH(FEET) = 22.45
FLOW VELOCITY(FEET/SEC.) = 1.14 DEPTH*VELOCITY(FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 240.00 TO NODE 242.00 = 1997.00 FEET.

*****
FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 62
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 344.50 DOWNSTREAM ELEVATION(FEET) = 344.00
STREET LENGTH(FEET) = 943.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.74
***STREET FLOWING FULL***
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.78
HALFSTREET FLOOD WIDTH(FEET) = 25.75
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.27
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.99
STREET FLOW TRAVEL TIME(MIN.) = 12.36 Tc(MIN.) = 41.36
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.942
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.71 0.69 0.100 61
COMMERCIAL B 2.54 0.69 0.100 61
COMMERCIAL B 3.84 0.69 0.100 61
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 12.05 0.69 0.600 61
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.69

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.399
SUBAREA AREA(ACRES) = 20.14 SUBAREA RUNOFF(CFS) = 12.12
EFFECTIVE AREA(ACRES) = 44.49 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 44.5 PEAK FLOW RATE(CFS) = 24.41

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.79 HALFSTREET FLOOD WIDTH(FEET) = 26.11
FLOW VELOCITY(FEET/SEC.) = 1.28 DEPTH*VELOCITY(FT*FT/SEC.) = 1.01
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 943.0 FT WITH ELEVATION-DROP = 0.5 FT, IS 21.4 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 243.00
LONGEST FLOWPATH FROM NODE 240.00 TO NODE 243.00 = 2940.00 FEET.

+-----+
| END OF SYSTEM "K" |
| |
| |
+-----+

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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 44.5 TC(MIN.) = 41.36
EFFECTIVE AREA(ACRES) = 44.49 AREA-AVERAGED Fm(INCH/HR)= 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.69 AREA-AVERAGED Ap = 0.485
PEAK FLOW RATE(CFS) = 24.41
=====

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END OF RATIONAL METHOD ANALYSIS

APPENDIX B

Street Capacity and Storm Drain Pipe Hydraulic Analysis

EXISTING SYSTEM STREET FLOW ANALYSIS - CITY OF MCFARLAND

D/S NODE	CALC'D HYDROLOGY Q (CFS)			EXISTING STORM DRAIN SIZE (IN/FT)	EXISTING STORM DRAIN CAPACITY (CFS)	STREET FLOW Q WITH CAPACITY FLOW IN STORM DRAIN (CFS)			ELEV (FT) NAVD 88	FLOW LENGTH	SLOPE	STREET	HALF STREET	ROADWAY TYPE	ROADWAY CLASS	EXIST Q/S*.5			MAX Q/S*.5			MAX ALLOWABLE STREET CAPACITY (CFS)			STREET FLOW DEFICIENCY			OVERFLOW (CFS)			DEPTH ABOVE ROW (FT)	MAX CAPACITY OF STREET (CFS)	FLOW ABOVE ROW (CFS)	FLOW ABOVE ROW (CFS)						
	10	25	100			10	25	100								10	25	100	10	25	100	10	25	100	10	25	100	10	25	100					10	25	100	10	25	100
	-					-										-			-			-			-			-							-					
TRIBUTARY AREA "E"																																								
70	0	0	-	-	0	0	0	353.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
71	4	7	-	-	4	0	7	352.50	1000	0.0020	EBELL ST	HALF	RESIDENTIAL	LOCAL	95.7	0.0	155.6	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-							
72	7	13	-	-	7	0	13	351.00	536	0.0028	SHERWOOD AVE	HALF	COLLECTOR	ARTERIAL	137.6	0.0	237.8	438	659	438	23	35	23	-	-	-	-	-	-	-	-	-	-	-						
73	8	16	-	-	8	0	16	350.00	1029	0.0020	SHERWOOD AVE	HALF	COLLECTOR	ARTERIAL	184.5	0.0	349.5	438	659	438	20	29	20	-	-	-	-	-	-	-	-	-	-	-	-					
74	9	16	-	-	9	0	16	346.00	1450	0.0028	10TH ST	HALF	RESIDENTIAL	LOCAL	174.4	0.0	310.5	438	230	741	23	12	39	-	-	-	-	-	-	-	-	-	-	-	-					
75	5	8	-	-	5	0	8	349.00	1000	0.0025	5TH ST	HALF	COLLECTOR	ARTERIAL	108.4	0.0	160.2	219	330	219	11	16	11	-	-	-	-	-	-	-	-	-	-	-	-					
76	9	14	-	-	9	0	14	348.50	398	0.0020	CALIFORNIA AVE	HALF	RESIDENTIAL	LOCAL	200.6	0.0	315.1	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-					
80	10	16	-	-	10	0	16	345.50	800	0.0038	8TH ST	HALF	RESIDENTIAL	LOCAL	158.1	0.0	264.2	438	230	741	27	14	45	-	-	-	-	-	-	-	-	-	-	-	-	-				
77	0	0	-	-	0	0	0	350.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
78	2	4	-	-	2	0	4	347.00	1000	0.0030	5TH ST	HALF	COLLECTOR	ARTERIAL	40.9	0.0	65.5	219	330	219	12	18	12	-	-	-	-	-	-	-	-	-	-	-	-	-				
79	6	10	-	-	6	0	10	346.50	204	0.0025	KERN AVE	HALF	COLLECTOR	ARTERIAL	120.0	0.0	198.0	219	330	219	11	16	11	-	-	-	-	-	-	-	-	-	-	-	-	-				
80	7	13	-	-	7	0	13	346.00	494	0.0020	KERN AVE	HALF	COLLECTOR	ARTERIAL	163.0	0.0	292.7	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-				
81	16	28	-	-	16	0	28	345.50	629	0.0020	KERN AVE	HALF	COLLECTOR	ARTERIAL	362.0	0.0	625.4	219	330	219	10	15	10	DEFICIENT	DEFICIENT	6	0	18	0.00	44	0	0	0	0						
87	24	42	-	-	24	0	42	345.00	532	0.0020	KERN AVE	HALF	COLLECTOR	ARTERIAL	532.0	0.0	933.1	219	330	219	10	15	10	DEFICIENT	DEFICIENT	14	0	32	0.00	44	0	0	0	0						
82	4	6	-	-	4	0	6	355.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
83	4	6	-	-	4	0	6	350.50	1000	0.0050	GARZOLI AVE	HALF	COLLECTOR	ARTERIAL	54.3	0.0	88.0	219	330	219	16	23	16	-	-	-	-	-	-	-	-	-	-	-	-					
86	4	6	-	-	4	0	6	350.00	849	0.0020	GARZOLI AVE	HALF	COLLECTOR	ARTERIAL	85.9	0.0	173.1	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
84	0	0	-	-	0	0	0	352.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
85	3	6	-	-	3	0	6	350.50	1000	0.0020	WOODRUFF AVE	HALF	RESIDENTIAL	LOCAL	77.6	0.0	129.5	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-				
86	4	7	-	-	4	0	7	350.00	1024	0.0020	SHERWOOD AVE	HALF	COLLECTOR	ARTERIAL	85.2	0.0	161.0	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
87	7	14	-	-	7	0	14	345.00	1518	0.0033	11TH ST	HALF	RESIDENTIAL	LOCAL	115.9	0.0	239.9	438	230	741	25	13	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
98	30	55	EX CB 24" PIPE	10	20	0	45	344.00	1162	0.0020	GARZOLI AVE	HALF	COLLECTOR	ARTERIAL	445.9	0.0	1001.8	219	330	219	10	15	10	DEFICIENT	DEFICIENT	10	0	35	0.00	44	0	1	0	0						
88	0	0	-	-	0	0	0	348.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
89	3	5	-	-	3	0	5	347.50	1000	0.0020	6TH ST	HALF	RESIDENTIAL	LOCAL	67.8	0.0	112.9	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
93	5	7	-	-	5	0	7	346.50	1607	0.0020	PERKINS AVE	HALF	COLLECTOR	ARTERIAL	101.3	0.0	167.5	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
90	0	0	-	-	0	0	0	348.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
91	2	3	-	-	2	0	3	347.50	922	0.0020	6TH ST	HALF	RESIDENTIAL	LOCAL	40.5	0.0	66.9	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
92	4	8	-	-	4	0	8	347.00	305	0.0020	ROBERTSON AVE	HALF	RESIDENTIAL	LOCAL	99.5	0.0	170.6	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
93	6	12	-	-	6	0	12	346.50	652	0.0020	8TH ST	HALF	RESIDENTIAL	LOCAL	137.5	0.0	266.1	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
94	12	22	-	-	12	0	22	346.00	465	0.0020	PERKINS AVE	HALF	COLLECTOR	ARTERIAL	257.1	0.0	488.8	219	330	219	10	15	10	DEFICIENT	DEFICIENT	2	0	12	0.00	44	0	0	0	0						
95	14	26	-	-	14	0	26	345.00	319	0.0031	PERKINS AVE	HALF	COLLECTOR	ARTERIAL	246.8	0.0	464.9	219	330	219	12	18	12	DEFICIENT	DEFICIENT	2	0	14	0.00	55	0	0	0	0						
98	15	27	-	-	15	0	27	344.00	267	0.0037	PERKINS AVE	HALF	COLLECTOR	ARTERIAL	237.7	0.0	441.5	219	330	219	13	20	13	DEFICIENT	DEFICIENT	1	0	14	0.00	60	0	0	0	0						
96	0	0	-	-	0	0	0	346.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
97	3	5	-	-	3	0	5	345.00	653	0.0020	11TH ST	HALF	RESIDENTIAL	LOCAL	69.3	0.0	111.4	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-				
98	4	7	-	-	4	0	7	344.00	554	0.0020	11TH ST	HALF	RESIDENTIAL	LOCAL	95.5	0.0	167.0	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
TRIBUTARY AREA "F"																																								
110	0	0	-	-	0	0	0	360.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
111	5	9	-	-	5	0	9	356.50	1000	0.0035	CLIFF AVE	HALF	RESIDENTIAL	LOCAL	91.3	0.0	139.6	438	230	741	26	14	44	-	-	-	-	-	-	-	-	-	-	-	-	-				
112	5	10	-	-	5	0	10	354.00	1571	0.0020	CLIFF AVE	HALF	RESIDENTIAL	LOCAL	121.9	0.0	232.8	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
116	5	10	-	-	5	0	10	353.00	1268	0.0020	MAST AVE	HALF	COLLECTOR	ARTERIAL	121.9	0.0	232.8	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
113	0	0	-	-	0	0	0	360.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
114	6	11	-	-	6	0	11	359.00	781	0.0020	FRONTAGE RD	HALF	COLLECTOR	ARTERIAL	139.3	0.0	239.3	438	659	438	20	29	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
115	13	23	-	-	13	0	23	353.50</																																

PROPOSED 10-YEAR SYSTEM STREET FLOW ANALYSIS - CITY OF MCFARLAND

D/S NODE	CALC'D HYDROLOGY Q (CFS)			PROPOSED STORM DRAIN SIZE (IN/FT)	PROPOSED STORM DRAIN CAPACITY (CFS)	STREET FLOW Q WITH CAPACITY FLOW IN STORM DRAIN (CFS)			ELEV (FT) NAVD 88	FLOW LENGTH	SLOPE	STREET	HALF STREET	ROADWAY TYPE	ROADWAY CLASS	EXIST Q/S*.5			MAX Q/S*.5			MAX ALLOWABLE STREET CAPACITY (CFS)			STREET FLOW DEFICIENCY			OVERFLOW (CFS)			DEPTH ABOVE ROW (FT)	MAX CAPACITY OF STREET (CFS)	FLOW ABOVE ROW (CFS)	FLOW ABOVE ROW (CFS)							
	10	25	100			10	25	100								10	25	100	10	25	100	10	25	100	10	25	100	10	25	100					10	25	100	100	-	10	100
	TRIBUTARY AREA "E"																																								
70	0	0	0	-	-	0	0	0	353.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
71	4	7	7	-	-	4	0	7	352.50	1000	0.0020	EBELL ST	HALF	RESIDENTIAL	LOCAL	95.7	0.0	155.6	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-						
72	7	13	13	-	-	7	0	13	351.00	536	0.0028	SHERWOOD AVE	-	COLLECTOR	ARTERIAL	137.6	0.0	237.8	438	659	438	23	35	23	-	-	-	-	-	-	-	-	-	-	-	-	-				
73	8	16	16	-	-	8	0	16	350.00	1029	0.0020	SHERWOOD AVE	-	COLLECTOR	ARTERIAL	184.5	0.0	349.5	438	659	438	20	29	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
81	9	16	16	-	-	9	0	16	346.00	1450	0.0028	10TH ST	-	RESIDENTIAL	LOCAL	174.4	0.0	310.5	438	230	741	23	12	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
74	0	0	0	-	-	0	0	0	351.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
75	5	8	8	-	-	5	0	8	349.00	1000	0.0025	5TH ST	HALF	COLLECTOR	ARTERIAL	108.4	0.0	160.2	219	330	219	11	16	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
76	9	14	14	-	-	9	0	14	348.50	398	0.0020	CALIFORNIA AVE	HALF	RESIDENTIAL	LOCAL	200.6	0.0	315.1	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
80	10	16	16	-	-	10	0	16	345.50	800	0.0038	8TH ST	-	RESIDENTIAL	LOCAL	158.1	0.0	264.2	438	230	741	27	14	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
77	0	0	0	-	-	0	0	0	350.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
78	2	4	4	-	-	2	0	4	347.00	1000	0.0030	5TH ST	HALF	COLLECTOR	ARTERIAL	40.9	0.0	65.5	219	330	219	12	18	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
79	6	10	10	-	-	6	0	10	346.50	204	0.0025	KERN AVE	HALF	COLLECTOR	ARTERIAL	120.0	0.0	198.0	219	330	219	11	16	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
80	7	13	13	-	-	7	0	13	346.00	494	0.0020	KERN AVE	HALF	COLLECTOR	ARTERIAL	163.0	0.0	292.7	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
81	16	28	28	PR CB & 24" PIPE	10	6	0	18	345.50	629	0.0020	KERN AVE	HALF	COLLECTOR	ARTERIAL	135.7	0.0	399.1	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
87	24	42	42	PR CB & 30" PIPE	18	5	0	23	345.00	532	0.0020	KERN AVE	HALF	COLLECTOR	ARTERIAL	121.9	0.0	523.0	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
82	0	0	0	-	-	0	0	0	355.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
83	4	6	6	-	-	4	0	6	350.50	1000	0.0050	GARZOLI AVE	HALF	COLLECTOR	ARTERIAL	54.3	0.0	88.0	219	330	219	16	23	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
86	4	8	8	-	-	4	0	8	350.00	849	0.0020	GARZOLI AVE	HALF	COLLECTOR	ARTERIAL	85.9	0.0	173.1	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
84	0	0	0	-	-	0	0	0	352.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
85	3	6	6	-	-	3	0	6	350.50	1000	0.0020	WOODRUFF AVE	HALF	RESIDENTIAL	LOCAL	77.6	0.0	129.5	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
86	4	7	7	-	-	4	0	7	350.00	1024	0.0020	SHERWOOD AVE	HALF	COLLECTOR	ARTERIAL	85.2	0.0	161.0	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
87	7	14	14	-	-	7	0	14	345.00	1518	0.0033	11TH ST	-	RESIDENTIAL	LOCAL	115.9	0.0	239.9	438	230	741	25	13	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
98	30	55	55	X CB & PR 36" PIP	30	0	0	25	344.00	1162	0.0020	GARZOLI AVE	HALF	COLLECTOR	ARTERIAL	5.1	0.0	561.0	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
88	0	0	0	-	-	0	0	0	348.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
89	3	5	5	-	-	3	0	5	347.50	1000	0.0020	6TH ST	HALF	RESIDENTIAL	LOCAL	67.8	0.0	112.9	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
93	5	7	7	-	-	5	0	7	346.50	1607	0.0020	PERKINS AVE	HALF	COLLECTOR	ARTERIAL	101.3	0.0	167.5	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
90	0	0	0	-	-	0	0	0	348.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
91	2	3	3	-	-	2	0	3	347.50	922	0.0020	6TH ST	HALF	RESIDENTIAL	LOCAL	40.5	0.0	66.9	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
92	4	8	8	-	-	4	0	8	347.00	305	0.0020	ROBERTSON AVE	HALF	RESIDENTIAL	LOCAL	99.5	0.0	170.6	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
93	6	12	12	-	-	6	0	12	346.50	652	0.0020	8TH ST	-	RESIDENTIAL	LOCAL	137.5	0.0	266.1	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
94	12	22	22	PR CB & 18" PIPE	5	7	0	17	346.00	465	0.0020	PERKINS AVE	HALF	COLLECTOR	ARTERIAL	152.1	0.0	383.7	219	330	219	10	15	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
95	14	26	26	PR 18" PIPE	5	9	0	21	345.00	319	0.0031	PERKINS AVE	HALF	COLLECTOR	ARTERIAL	162.9	0.0	381.0	219	330	219	12	18	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
98	15	27	27	PR 18" PIPE	5	10	0	22	344.00	267	0.0037	PERKINS AVE	HALF	COLLECTOR	ARTERIAL	161.0	0.0	364.7	219	330	219	13	20	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
96	0	0	0	-	-	0	0	0	346.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
97	3	5	5	-	-	3	0	5	345.00	653	0.0020	11TH ST	-	RESIDENTIAL	LOCAL	69.3	0.0	111.4	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
98	4	7	7	-	-	4	0	7	344.00	554	0.0020	11TH ST	-	RESIDENTIAL	LOCAL	95.5	0.0	167.0	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TRIBUTARY AREA "F"																																									
110	0	0	0	-	-	0	0	0	360.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
111	5	8	8	-	-	5	0	8	356.50	1000	0.0035	CLIFF AVE	-	RESIDENTIAL	LOCAL	91.3	0.0	139.6	438	230	741	26	14	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
112	5	10	10	-	-	5	0	10	354.00	1571	0.0020	CLIFF AVE	-	RESIDENTIAL	LOCAL	121.9	0.0	232.8	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
116	5	10	10	-	-	5	0	10	35																																

PROPOSED 10-YEAR SYSTEM STREET FLOW ANALYSIS - CITY OF MCFARLAND

D/S NODE	CALC'D HYDROLOGY Q (CFS)			PROPOSED STORM DRAIN SIZE (IN/FT)	PROPOSED STORM DRAIN CAPACITY (CFS)	STREET FLOW Q WITH CAPACITY FLOW IN STORM DRAIN (CFS)			ELEV (FT) NAVD 88	FLOW LENGTH	SLOPE	STREET	HALF STREET	ROADWAY TYPE	ROADWAY CLASS	EXIST Q/S^1.5			MAX Q/S^1.5			MAX ALLOWABLE STREET CAPACITY (CFS)			STREET FLOW DEFICIENCY			OVERFLOW (CFS)			DEPTH ABOVE ROW (FT)	MAX CAPACITY OF STREET (CFS)	FLOW ABOVE ROW (CFS)	FLOW ABOVE ROW (CFS)						
	10	25	100			10	25	100								10	25	100	10	25	100	10	25	100	10	25	100	10	25	100					10	25	100	100	10	100
	TRIBUTARY AREA "G"																																							
TRIBUTARY AREA "H"																																								
TRIBUTARY AREA "I"																																								
TRIBUTARY AREA "J"																																								
200	0	0	0	-	-	0	0	0	365.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
201	10	15	15	-	-	10	0	15	362.00	1000	0.0030	BROWNING RD	-	COLLECTOR	ARTERIAL	191.3	0.0	282.8	438	659	438	24	36	24	-	-	-	-	-	-	-	-	-	-						
202	21	32	32	-	-	21	0	32	360.00	732	0.0027	BROWNING RD	-	COLLECTOR	ARTERIAL	384.3	0.0	603.4	438	659	438	23	34	23	-	-	-	-	-	-	-	-	-	-	-	-				
203	27	43	43	PR CB & 24" PIPE	10	17	0	33	359.50	1148	0.0020	BROWNING RD	-	COLLECTOR	ARTERIAL	381.9	0.0	728.7	438	659	438	20	29	20	DEFICIENT	0	0	13	0.00	88	0	0	0	0						
204	27	44	44	PR CB & 30" PIPE	18	9	0	26	355.00	1481	0.0030	BROWNING RD	HALF	COLLECTOR	ARTERIAL	165.6	0.0	467.1	219	330	219	12	18	12	DEFICIENT	0	0	14	0.00	54	0	0	0	0						
216	27	44	44	PR 30" PIPE	18	9	0	26	352.50	1197	0.0021	BROWNING RD	HALF	COLLECTOR	ARTERIAL	199.8	0.0	563.4	219	330	219	10	15	10	DEFICIENT	0	0	16	0.00	45	0	0	0	0						
205	0	0	0	-	-	0	0	0	363.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
206	7	11	11	-	-	7	0	11	361.00	1000	0.0020	MARSHALL ST	-	RESIDENTIAL	LOCAL	154.3	0.0	244.2	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-				
209	9	17	17	-	-	9	0	17	359.00	1280	0.0020	MARSHALL ST	-	RESIDENTIAL	LOCAL	204.8	0.0	383.7	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
207	0	0	0	-	-	0	0	0	367.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
208	6	11	11	-	-	6	0	11	362.00	1000	0.0055	ROBERTSON AVE	-	RESIDENTIAL	LOCAL	81.4	0.0	154.5	438	230	741	33	17	55	-	-	-	-	-	-	-	-	-	-	-	-	-			
209	6	12	12	-	-	6	0	12	359.00	806	0.0037	MARSHALL ST	-	RESIDENTIAL	LOCAL	99.0	0.0	198.0	438	230	741	27	14	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
215	15	33	33	-	-	15	0	33	350.00	1281	0.0070	MT ARBOR ST	-	RESIDENTIAL	LOCAL	176.9	0.0	394.2	438	230	741	37	19	62	-	-	-	-	-	-	-	-	-	-	-	-	-			
210	0	0	0	-	-	0	0	0	361.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
211	5	8	8	-	-	5	0	8	359.50	1000	0.0020	MT ARBOR ST	-	RESIDENTIAL	LOCAL	112.9	0.0	177.8	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
214	7	12	12	-	-	7	0	12	357.00	813	0.0031	KERN AVE	-	RESIDENTIAL	LOCAL	131.3	0.0	220.9	438	230	741	24	13	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
212	0	0	0	-	-	0	0	0	360.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
213	7	11	11	-	-	7	0	11	359.00	1000	0.0020	SAN PEDRO ST	-	RESIDENTIAL	LOCAL	156.7	0.0	248.4	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
214	9	15	15	-	-	9	0	15	357.00	673	0.0030	SAN PEDRO ST	-	RESIDENTIAL	LOCAL	166.7	0.0	279.4	438	230	741	24	13	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
215	16	30	30	-	-	16	0	30	355.00	1310	0.0020	SAN PEDRO ST	-	RESIDENTIAL	LOCAL	365.6	0.0	673.5	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
216	31	63	63	PR CB & 24" PIPE	10	21	0	52	352.50	714	0.0035	PERKINS AVE	-	COLLECTOR	ARTERIAL	348.3	0.0	886.9	438	659	438	26	39	26	DEFICIENT	0	0	27	0.00	116	0	0	0	0	0	0				
220	0	0	0	-	-	0	0	0	359.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
221	6	8	8	-	-	6	0	8	355.00	1000	0.0040	SAN JUAN ST	HALF	RESIDENTIAL	LOCAL	90.4	0.0	134.1	219	115	371	14	7	23	-	-	-	-	-	-	-	-	-	-	-	-	-			
222	7	13	13	-	-	7	0	13	353.00	1253	0.0020	SAN JUAN ST	HALF	RESIDENTIAL	LOCAL	166.6	0.0	286.9	219	115	371	10	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-			
223	9	16	16	-	-	9	0	16	350.50	668	0.0037	SAN JUAN ST	HALF	RESIDENTIAL	LOCAL	140.4	0.0	253.4	219	115	371	13	7	23	-	-	-	-	-	-	-	-	-	-	-	-	-			
227	65	120	120	X CB & 5.5x2' BO	46	20	0	74	350.00	506	0.0020	PERKINS AVE	-	COLLECTOR	ARTERIAL	436.3	0.0	1659.2	438	659	438	20	29	20	DEFICIENT	0	0	55	0.00	88	0	0	0	0	0	0				
224	0	0	0	-	-	0	0	0	360.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
225	10	16	16	-	-	10	0	16	355.00	1000	0.0050	INDUSTRIAL ST	-	RESIDENTIAL	LOCAL	147.2	0.0	222.2	438	230	741	31	16	52	-	-	-	-	-	-	-	-	-	-	-	-	-			
226	14	24	24	-	-	14	0	24	354.50	912	0.0020	INDUSTRIAL ST	-	RESIDENTIAL	LOCAL	322.0	0.0	530.6	438	230	741	20	10	33	-	-	-	-	-	-	-	-	-	-	-	-	-			
227	20	35	35	-	-	20	0	35	350.00	1336	0.0034	INDUSTRIAL ST	-	RESIDENTIAL	LOCAL	345.0	0.0	595.5	438	230	741	25	13	43	-	-	-	-	-	-	-	-	-	-	-	-	-			
230	0	0	0	-	-	0	0	0	355.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
231	5	9	9	-	-	5	0	9	352.00	1000	0.0030	BROWNING RD	-	COLLECTOR	ARTERIAL	96.8	0.0	158.5	438	659	438	24	36	24	-	-	-	-	-	-	-	-	-	-	-	-	-			
233	10	19	19	-	-	10	0	19	350.00	575	0.0035	BROWNING RD	-	COLLECTOR	ARTERIAL	175.2	0.0	316.7	438	659	438	26	39	26	-	-	-	-	-	-	-	-	-	-	-	-	-			
232	0	0	0	-	-	0	0	0	351.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
233	5	9	9	-	-	5	0	9	350.00	841	0.0020	BROWNING RD	-	COLLECTOR	ARTERIAL	110.9	0.0	199.2	438	659	438	20	29	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
236	17	33	33	-	-	17	0	33	340.00	871	0.0115	GLENWOOD AVE	-	RESIDENTIAL	LOCAL	162.3	0.0	311.3	438	230	741	47	25	79	-	-	-	-	-	-	-	-	-	-	-	-	-			
234	0	0	0	-	-	0	0	0	348.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
235	9	14	14	-	-	9	0	14	345.00	895	0.0039	BRENTWOOD CT	-	RESIDENTIAL	LOCAL	142.8	0.0	229.3	438	230	741	27	14	46	-	-	-	-	-	-	-	-	-	-	-	-	-			
TRIBUTARY AREA "K"																																								
240	0	0	0	-	-	0	0	0	349.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
241	8	13	13	-	-	8	0	13	345.00	1000	0.0040	BROWNING RD	HALF	COLLECTOR	ARTERIAL	122.1	0.0	198.7	219	330	219	14	21	14	-	-	-	-	-	-	-	-	-	-	-	-				
242	8	18	18	-	-	8	0	18	344.50	997	0.0020	ELMO HWY	HALF	PRIMARY (4)	ARTERIAL	185.8	0.0																							

Worksheet for Full Flow 18" RCP @ 0.2%

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00200	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft
Discharge	4.70	ft ³ /s

Results

Discharge	4.70	ft ³ /s
Normal Depth	1.50	ft
Flow Area	1.77	ft ²
Wetted Perimeter	4.71	ft
Hydraulic Radius	0.38	ft
Top Width	0.00	ft
Critical Depth	0.83	ft
Percent Full	100.0	%
Critical Slope	0.00566	ft/ft
Velocity	2.66	ft/s
Velocity Head	0.11	ft
Specific Energy	1.61	ft
Froude Number	0.00	
Maximum Discharge	5.05	ft ³ /s
Discharge Full	4.70	ft ³ /s
Slope Full	0.00200	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Full Flow 18" RCP @ 0.2%

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	0.83	ft
Channel Slope	0.00200	ft/ft
Critical Slope	0.00566	ft/ft

Worksheet for Full Flow 24" RCP @ 0.2%

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00200	ft/ft
Normal Depth	2.00	ft
Diameter	2.00	ft
Discharge	10.12	ft ³ /s

Results

Discharge	10.12	ft ³ /s
Normal Depth	2.00	ft
Flow Area	3.14	ft ²
Wetted Perimeter	6.28	ft
Hydraulic Radius	0.50	ft
Top Width	0.00	ft
Critical Depth	1.14	ft
Percent Full	100.0	%
Critical Slope	0.00522	ft/ft
Velocity	3.22	ft/s
Velocity Head	0.16	ft
Specific Energy	2.16	ft
Froude Number	0.00	
Maximum Discharge	10.88	ft ³ /s
Discharge Full	10.12	ft ³ /s
Slope Full	0.00200	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Full Flow 24" RCP @ 0.2%

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.00	ft
Critical Depth	1.14	ft
Channel Slope	0.00200	ft/ft
Critical Slope	0.00522	ft/ft

Worksheet for Full Flow 30" RCP @ 0.2%

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00200	ft/ft
Normal Depth	2.50	ft
Diameter	2.50	ft
Discharge	18.34	ft ³ /s

Results

Discharge	18.34	ft ³ /s
Normal Depth	2.50	ft
Flow Area	4.91	ft ²
Wetted Perimeter	7.85	ft
Hydraulic Radius	0.63	ft
Top Width	0.00	ft
Critical Depth	1.45	ft
Percent Full	100.0	%
Critical Slope	0.00491	ft/ft
Velocity	3.74	ft/s
Velocity Head	0.22	ft
Specific Energy	2.72	ft
Froude Number	0.00	
Maximum Discharge	19.73	ft ³ /s
Discharge Full	18.34	ft ³ /s
Slope Full	0.00200	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Full Flow 30" RCP @ 0.2%

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.50	ft
Critical Depth	1.45	ft
Channel Slope	0.00200	ft/ft
Critical Slope	0.00491	ft/ft

Worksheet for Full Flow 36" RCP @ 0.2%

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00200	ft/ft
Normal Depth	3.00	ft
Diameter	3.00	ft
Discharge	29.83	ft ³ /s

Results

Discharge	29.83	ft ³ /s
Normal Depth	3.00	ft
Flow Area	7.07	ft ²
Wetted Perimeter	9.42	ft
Hydraulic Radius	0.75	ft
Top Width	0.00	ft
Critical Depth	1.77	ft
Percent Full	100.0	%
Critical Slope	0.00467	ft/ft
Velocity	4.22	ft/s
Velocity Head	0.28	ft
Specific Energy	3.28	ft
Froude Number	0.00	
Maximum Discharge	32.08	ft ³ /s
Discharge Full	29.83	ft ³ /s
Slope Full	0.00200	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Full Flow 36" RCP @ 0.2%

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.00	ft
Critical Depth	1.77	ft
Channel Slope	0.00200	ft/ft
Critical Slope	0.00467	ft/ft

Worksheet for Full Flow 42" RCP @ 0.2%

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00200	ft/ft
Normal Depth	3.50	ft
Diameter	3.50	ft
Discharge	44.99	ft ³ /s

Results

Discharge	44.99	ft ³ /s
Normal Depth	3.50	ft
Flow Area	9.62	ft ²
Wetted Perimeter	11.00	ft
Hydraulic Radius	0.88	ft
Top Width	0.00	ft
Critical Depth	2.09	ft
Percent Full	100.0	%
Critical Slope	0.00448	ft/ft
Velocity	4.68	ft/s
Velocity Head	0.34	ft
Specific Energy	3.84	ft
Froude Number	0.00	
Maximum Discharge	48.40	ft ³ /s
Discharge Full	44.99	ft ³ /s
Slope Full	0.00200	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Full Flow 42" RCP @ 0.2%

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.50	ft
Critical Depth	2.09	ft
Channel Slope	0.00200	ft/ft
Critical Slope	0.00448	ft/ft

Worksheet for Full Flow 48" RCP @ 0.2%

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00200	ft/ft
Normal Depth	4.00	ft
Diameter	4.00	ft
Discharge	64.24	ft ³ /s

Results

Discharge	64.24	ft ³ /s
Normal Depth	4.00	ft
Flow Area	12.57	ft ²
Wetted Perimeter	12.57	ft
Hydraulic Radius	1.00	ft
Top Width	0.00	ft
Critical Depth	2.42	ft
Percent Full	100.0	%
Critical Slope	0.00433	ft/ft
Velocity	5.11	ft/s
Velocity Head	0.41	ft
Specific Energy	4.41	ft
Froude Number	0.00	
Maximum Discharge	69.10	ft ³ /s
Discharge Full	64.24	ft ³ /s
Slope Full	0.00200	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Full Flow 48" RCP @ 0.2%

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.00	ft
Critical Depth	2.42	ft
Channel Slope	0.00200	ft/ft
Critical Slope	0.00433	ft/ft

Worksheet for Full Flow 5.5'W x 2'H Box

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00200	ft/ft
Normal Depth	2.00	ft
Height	2.00	ft
Bottom Width	5.50	ft
Discharge	45.73	ft ³ /s

Results

Flow Area	11.00	ft ²
Wetted Perimeter	15.00	ft
Hydraulic Radius	0.73	ft
Top Width	5.50	ft
Critical Depth	1.29	ft
Percent Full	100.0	%
Critical Slope	0.00378	ft/ft
Velocity	4.16	ft/s
Velocity Head	0.27	ft
Specific Energy	2.27	ft
Froude Number	0.52	
Discharge Full	45.73	ft ³ /s
Slope Full	0.00200	ft/ft
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for Full Flow 5.5'W x 2'H Box

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.00	ft
Critical Depth	1.29	ft
Channel Slope	0.00200	ft/ft
Critical Slope	0.00378	ft/ft

Worksheet for Full Flow 6.5'W x 3'H Box

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00200	ft/ft
Normal Depth	3.00	ft
Height	3.00	ft
Bottom Width	6.50	ft
Discharge	101.42	ft ³ /s

Results

Flow Area	19.50	ft ²
Wetted Perimeter	19.00	ft
Hydraulic Radius	1.03	ft
Top Width	6.50	ft
Critical Depth	1.96	ft
Percent Full	100.0	%
Critical Slope	0.00369	ft/ft
Velocity	5.20	ft/s
Velocity Head	0.42	ft
Specific Energy	3.42	ft
Froude Number	0.53	
Discharge Full	101.42	ft ³ /s
Slope Full	0.00200	ft/ft
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for Full Flow 6.5'W x 3'H Box

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.00	ft
Critical Depth	1.96	ft
Channel Slope	0.00200	ft/ft
Critical Slope	0.00369	ft/ft

APPENDIX C

Sump Basin Calculations

F L O O D R O U T I N G A N A L Y S I S
USING KERN COUNTY UNIT-HYDROGRAPH (1992 MANUAL)
(c) Copyright 1989-2013 Advanced Engineering Software (aes)
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****

* CITY OF MCFARLAND *
* BASIN ROUTING UNIT HYDROGRAPHS *
* 10-YEAR FEBRUARY 2015 NZAMARRIPA *

FILE NAME: HMC10BAS.DAT
TIME/DATE OF STUDY: 09:55 02/03/2015

** INPUT SUMMARY **

FLOW PROCESS FROM NODE 1.00 TO NODE 11.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #1<<<<<

=====

WATERSHED AREA = 76.100 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
*USER ENTERED "LAG" TIME = 1.060 HOURS
STORM RETURN FREQUENCY = 10-YEAR
VALLEY (UNDEVELOPED) / DESERT S-GRAPH SELECTED
MAXIMUM WATERSHED LOSS RATE (INCH/HOUR) = 0.290; LOW LOSS FRACTION = 0.491
WATERSHED REGION: SAN JOAQUIN VALLEY
LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
USER SPECIFIED RAINFALL VALUES:
 2-YR 6-HR RAINFALL DEPTH (INCH) = 0.78
 2-YR 24-HR RAINFALL DEPTH (INCH) = 1.15
100-YR 6-HR RAINFALL DEPTH (INCH) = 1.75
100-YR 24-HR RAINFALL DEPTH (INCH) = 2.60
SPECIFIED PEAK RAINFALL DEPTHS (INCH):
5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
 3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE = 0.997; 30-MINUTE = 0.997; 1-HOUR = 0.997
 3-HOUR = 0.999; 6-HOUR = 1.000; 24-HOUR = 1.000

FLOW PROCESS FROM NODE 11.00 TO NODE 11.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<

=====

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
 THROUGH A FLOW-THROUGH DETENTION BASIN.
 SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 DEAD STORAGE (AF) = 0.000
 SPECIFIED DEAD STORAGE (AF) FILLED = 0.000
 SPECIFIED EFFECTIVE VOLUME (AF) FILLED ABOVE OUTLET = 0.000
 DETENTION BASIN CONSTANT LOSS RATE (CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	1.00	0.01	0.540
3	3.00	0.02	1.770
4	5.00	0.03	3.200
5	7.00	0.04	4.840
6	9.00	0.05	6.690

FLOW PROCESS FROM NODE 15.00 TO NODE 26.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #2<<<<<

WATERSHED AREA = 82.900 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
 *USER ENTERED "LAG" TIME = 0.500 HOURS
 STORM RETURN FREQUENCY = 10-YEAR
 VALLEY (UNDEVELOPED) / DESERT S-GRAPH SELECTED
 MAXIMUM WATERSHED LOSS RATE (INCH/HOUR) = 0.340; LOW LOSS FRACTION = 0.565
 WATERSHED REGION: SAN JOAQUIN VALLEY
 LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
 USER SPECIFIED RAINFALL VALUES:
 2-YR 6-HR RAINFALL DEPTH (INCH) = 0.78
 2-YR 24-HR RAINFALL DEPTH (INCH) = 1.15
 100-YR 6-HR RAINFALL DEPTH (INCH) = 1.75
 100-YR 24-HR RAINFALL DEPTH (INCH) = 2.60
 SPECIFIED PEAK RAINFALL DEPTHS (INCH):
 5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
 3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
 PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
 5-MINUTE = 0.996; 30-MINUTE = 0.996; 1-HOUR = 0.996
 3-HOUR = 0.999; 6-HOUR = 1.000; 24-HOUR = 1.000

FLOW PROCESS FROM NODE 26.00 TO NODE 26.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #2<<<<<

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 2
 THROUGH A FLOW-THROUGH DETENTION BASIN.
 SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 DEAD STORAGE (AF) = 0.000
 SPECIFIED DEAD STORAGE (AF) FILLED = 0.000
 SPECIFIED EFFECTIVE VOLUME (AF) FILLED ABOVE OUTLET = 0.000
 DETENTION BASIN CONSTANT LOSS RATE (CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.60	0.01	0.500
3	2.60	0.02	1.590
4	4.60	0.03	2.830
5	6.60	0.04	4.220
6	7.60	0.05	4.980
7	8.00	5.00	5.090

FLOW PROCESS FROM NODE 30.00 TO NODE 33.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #3<<<<<

WATERSHED AREA = 29.000 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
 *USER ENTERED "LAG" TIME = 0.440 HOURS
 STORM RETURN FREQUENCY = 10-YEAR
 VALLEY (UNDEVELOPED) / DESERT S-GRAPH SELECTED
 MAXIMUM WATERSHED LOSS RATE (INCH/HOUR) = 0.070; LOW LOSS FRACTION = 0.213
 WATERSHED REGION: SAN JOAQUIN VALLEY
 LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
 USER SPECIFIED RAINFALL VALUES:
 2-YR 6-HR RAINFALL DEPTH (INCH) = 0.78
 2-YR 24-HR RAINFALL DEPTH (INCH) = 1.15
 100-YR 6-HR RAINFALL DEPTH (INCH) = 1.75
 100-YR 24-HR RAINFALL DEPTH (INCH) = 2.60
 SPECIFIED PEAK RAINFALL DEPTHS (INCH):
 5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
 3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
 PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
 5-MINUTE = 0.999; 30-MINUTE = 0.999; 1-HOUR = 0.999
 3-HOUR = 1.000; 6-HOUR = 1.000; 24-HOUR = 1.000

FLOW PROCESS FROM NODE 33.00 TO NODE 33.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #3<<<<<

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 3
 THROUGH A FLOW-THROUGH DETENTION BASIN.
 SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 DEAD STORAGE (AF) = 0.000
 SPECIFIED DEAD STORAGE (AF) FILLED = 0.000
 SPECIFIED EFFECTIVE VOLUME (AF) FILLED ABOVE OUTLET = 0.000
 DETENTION BASIN CONSTANT LOSS RATE (CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000

2	1.00	0.01	0.270
3	3.00	0.02	0.870
4	5.00	18.00	1.560

 FLOW PROCESS FROM NODE 34.00 TO NODE 38.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #4<<<<<

=====

WATERSHED AREA = 42.900 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
 *USER ENTERED "LAG" TIME = 0.303 HOURS
 STORM RETURN FREQUENCY = 10-YEAR
 VALLEY (UNDEVELOPED) / DESERT S-GRAPH SELECTED
 MAXIMUM WATERSHED LOSS RATE (INCH/HOUR) = 0.340; LOW LOSS FRACTION = 0.549
 WATERSHED REGION: SAN JOAQUIN VALLEY
 LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
 USER SPECIFIED RAINFALL VALUES:
 2-YR 6-HR RAINFALL DEPTH (INCH) = 0.78
 2-YR 24-HR RAINFALL DEPTH (INCH) = 1.15
 100-YR 6-HR RAINFALL DEPTH (INCH) = 1.75
 100-YR 24-HR RAINFALL DEPTH (INCH) = 2.60
 SPECIFIED PEAK RAINFALL DEPTHS (INCH):
 5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
 3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
 PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
 5-MINUTE = 0.998; 30-MINUTE = 0.998; 1-HOUR = 0.998
 3-HOUR = 1.000; 6-HOUR = 1.000; 24-HOUR = 1.000

 FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #4<<<<<

=====

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 4
 THROUGH A FLOW-THROUGH DETENTION BASIN.
 SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 DEAD STORAGE (AF) = 0.000
 SPECIFIED DEAD STORAGE (AF) FILLED = 0.000
 SPECIFIED EFFECTIVE VOLUME (AF) FILLED ABOVE OUTLET = 0.000
 DETENTION BASIN CONSTANT LOSS RATE (CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	1.00	0.01	1.820
3	3.00	0.02	5.660
4	5.00	0.03	9.780

 FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 6

>>>>STREAM NUMBER 1 CLEARED AND SET TO ZERO<<<<<

FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 6

>>>>STREAM NUMBER 2 CLEARED AND SET TO ZERO<<<<<

FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 6

>>>>STREAM NUMBER 3 CLEARED AND SET TO ZERO<<<<<

FLOW PROCESS FROM NODE 38.00 TO NODE 38.00 IS CODE = 6

>>>>STREAM NUMBER 4 CLEARED AND SET TO ZERO<<<<<

FLOW PROCESS FROM NODE 40.00 TO NODE 51.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #1<<<<<

WATERSHED AREA = 70.900 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
*USER ENTERED "LAG" TIME = 0.450 HOURS
STORM RETURN FREQUENCY = 10-YEAR
VALLEY (UNDEVELOPED) / DESERT S-GRAPH SELECTED
MAXIMUM WATERSHED LOSS RATE (INCH/HOUR) = 0.330; LOW LOSS FRACTION = 0.524
WATERSHED REGION: SAN JOAQUIN VALLEY
LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
USER SPECIFIED RAINFALL VALUES:
2-YR 6-HR RAINFALL DEPTH (INCH) = 0.78
2-YR 24-HR RAINFALL DEPTH (INCH) = 1.15
100-YR 6-HR RAINFALL DEPTH (INCH) = 1.75
100-YR 24-HR RAINFALL DEPTH (INCH) = 2.60
SPECIFIED PEAK RAINFALL DEPTHS (INCH):
5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE = 0.997; 30-MINUTE = 0.997; 1-HOUR = 0.997
3-HOUR = 1.000; 6-HOUR = 1.000; 24-HOUR = 1.000

FLOW PROCESS FROM NODE 51.00 TO NODE 51.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN.
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

DEAD STORAGE (AF) = 0.000
 SPECIFIED DEAD STORAGE (AF) FILLED = 0.000
 SPECIFIED EFFECTIVE VOLUME (AF) FILLED ABOVE OUTLET = 0.000
 DETENTION BASIN CONSTANT LOSS RATE (CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	1.00	0.01	0.340
3	3.00	0.02	1.120
4	6.00	0.03	2.590
5	9.00	0.04	5.130
6	9.77	0.05	6.050

 FLOW PROCESS FROM NODE 52.00 TO NODE 58.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #2<<<<<

=====

WATERSHED AREA = 42.500 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
 *USER ENTERED "LAG" TIME = 0.490 HOURS
 STORM RETURN FREQUENCY = 10-YEAR
 VALLEY (UNDEVELOPED) / DESERT S-GRAPH SELECTED
 MAXIMUM WATERSHED LOSS RATE (INCH/HOUR) = 0.410; LOW LOSS FRACTION = 0.616
 WATERSHED REGION: SAN JOAQUIN VALLEY
 LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
 USER SPECIFIED RAINFALL VALUES:
 2-YR 6-HR RAINFALL DEPTH (INCH) = 0.78
 2-YR 24-HR RAINFALL DEPTH (INCH) = 1.15
 100-YR 6-HR RAINFALL DEPTH (INCH) = 1.75
 100-YR 24-HR RAINFALL DEPTH (INCH) = 2.60
 SPECIFIED PEAK RAINFALL DEPTHS (INCH):
 5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
 3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
 PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
 5-MINUTE = 0.998; 30-MINUTE = 0.998; 1-HOUR = 0.998
 3-HOUR = 1.000; 6-HOUR = 1.000; 24-HOUR = 1.000

 FLOW PROCESS FROM NODE 58.00 TO NODE 58.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #2<<<<<

=====

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 2
 THROUGH A FLOW-THROUGH DETENTION BASIN.
 SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 DEAD STORAGE (AF) = 0.000
 SPECIFIED DEAD STORAGE (AF) FILLED = 0.000
 SPECIFIED EFFECTIVE VOLUME (AF) FILLED ABOVE OUTLET = 0.000
 DETENTION BASIN CONSTANT LOSS RATE (CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	1.00	0.01	0.240
3	3.00	0.02	0.780
4	5.00	0.03	1.390
5	8.00	1.50	2.490

FLOW PROCESS FROM NODE 70.00 TO NODE 98.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #3<<<<<

WATERSHED AREA = 164.900 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
*USER ENTERED "LAG" TIME = 0.810 HOURS
STORM RETURN FREQUENCY = 10-YEAR
VALLEY (UNDEVELOPED) / DESERT S-GRAPH SELECTED
MAXIMUM WATERSHED LOSS RATE (INCH/HOUR) = 0.290; LOW LOSS FRACTION = 0.486
WATERSHED REGION: SAN JOAQUIN VALLEY
LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
USER SPECIFIED RAINFALL VALUES:
2-YR 6-HR RAINFALL DEPTH (INCH) = 0.78
2-YR 24-HR RAINFALL DEPTH (INCH) = 1.15
100-YR 6-HR RAINFALL DEPTH (INCH) = 1.75
100-YR 24-HR RAINFALL DEPTH (INCH) = 2.60
SPECIFIED PEAK RAINFALL DEPTHS (INCH):
5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE = 0.993; 30-MINUTE = 0.993; 1-HOUR = 0.993
3-HOUR = 0.999; 6-HOUR = 0.999; 24-HOUR = 1.000

FLOW PROCESS FROM NODE 98.00 TO NODE 98.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #3<<<<<

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 3
THROUGH A FLOW-THROUGH DETENTION BASIN.
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE (AF) = 0.000
SPECIFIED DEAD STORAGE (AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME (AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE (CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	1.00	0.01	1.390
3	3.00	0.02	4.380
4	5.00	0.03	7.617
5	8.00	2.90	13.000

FLOW PROCESS FROM NODE 110.00 TO NODE 153.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #4<<<<<

WATERSHED AREA = 409.700 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
*USER ENTERED "LAG" TIME = 1.190 HOURS
STORM RETURN FREQUENCY = 10-YEAR
VALLEY (UNDEVELOPED) / DESERT S-GRAPH SELECTED
MAXIMUM WATERSHED LOSS RATE (INCH/HOUR) = 0.240; LOW LOSS FRACTION = 0.421
WATERSHED REGION: SAN JOAQUIN VALLEY
LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
USER SPECIFIED RAINFALL VALUES:
2-YR 6-HR RAINFALL DEPTH (INCH) = 0.78
2-YR 24-HR RAINFALL DEPTH (INCH) = 1.15
100-YR 6-HR RAINFALL DEPTH (INCH) = 1.75
100-YR 24-HR RAINFALL DEPTH (INCH) = 2.60
SPECIFIED PEAK RAINFALL DEPTHS (INCH):
5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE = 0.982; 30-MINUTE = 0.982; 1-HOUR = 0.982
3-HOUR = 0.997; 6-HOUR = 0.999; 24-HOUR = 0.999

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #4<<<<<

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 4
THROUGH A FLOW-THROUGH DETENTION BASIN.
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE (AF) = 0.000
SPECIFIED DEAD STORAGE (AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME (AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE (CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

Table with 4 columns: INTERVAL NUMBER, DEPTH (FT), OUTFLOW (CFS), STORAGE (AF). Rows 1-8 showing increasing depth and storage values.

FLOW PROCESS FROM NODE 200.00 TO NODE 236.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS) ADDED TO STREAM #5<<<<<

=====

WATERSHED AREA = 312.500 ACRES; BASEFLOW = 0.000 CFS/SQUARE-MILE
*USER ENTERED "LAG" TIME = 0.780 HOURS
STORM RETURN FREQUENCY = 10-YEAR
VALLEY(UNDEVELOPED)/DESERT S-GRAPH SELECTED
MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) = 0.250; LOW LOSS FRACTION = 0.426
WATERSHED REGION: SAN JOAQUIN VALLEY
LATITUDE (DECIMAL) AT THE WATERSHED CENTRIOD = 35.67
USER SPECIFIED RAINFALL VALUES:
2-YR 6-HR RAINFALL DEPTH(INCH) = 0.78
2-YR 24-HR RAINFALL DEPTH(INCH) = 1.15
100-YR 6-HR RAINFALL DEPTH(INCH) = 1.75
100-YR 24-HR RAINFALL DEPTH(INCH) = 2.60
SPECIFIED PEAK RAINFALL DEPTHS(INCH):
5-MINUTE = 0.21; 30-MINUTE = 0.40; 1-HOUR = 0.51
3-HOUR = 0.85; 6-HOUR = 1.18; 24-HOUR = 1.75
PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE = 0.986; 30-MINUTE = 0.986; 1-HOUR = 0.986
3-HOUR = 0.998; 6-HOUR = 0.999; 24-HOUR = 0.999

FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 3.1

>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #5<<<<<

=====

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 5
THROUGH A FLOW-THROUGH DETENTION BASIN.
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.000
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	1.00	0.01	2.570
3	3.00	0.02	7.910
4	5.00	0.03	13.560
5	8.00	0.04	22.630
6	11.00	0.05	32.430
7	15.00	0.07	46.660
8	20.00	0.08	66.390

=====

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* AES FLOODSCx PROGRAM RESULTS SUMMARY *

INPUT FILENAME: [HMC10BAS.DAT]
 Page: 1 of 1

UPSTREAM TIME (2) PEAK (HR)	DOWNSTREAM TIME (2) PEAK (HR)	MAX. STORAGE MODELED (AF)	HYDROLOGIC/HYDRAULIC PROCESS FOOTNOTES	UPSTREAM PEAK (CFS)	DOWNSTREAM PEAK (CFS)
1.00	11.00		Subarea (UH) Added to Stream #1	0.0	19.8
16.917					
11.00	11.00		Flow-Through Basin: Stream #1	19.8	0.1
29.000	6.11				
15.00	26.00		Subarea (UH) Added to Stream #2	0.0	33.6
16.500					
26.00	26.00		Flow-Through Basin: Stream #2	33.6	3.8
18.667	5.06				
30.00	33.00		Subarea (UH) Added to Stream #3	0.0	17.4
16.417					
33.00	33.00		Flow-Through Basin: Stream #3	17.4	11.3
16.667	1.30				
34.00	38.00		Subarea (UH) Added to Stream #4	0.0	25.1
16.333					
38.00	38.00		Flow-Through Basin: Stream #4	25.1	0.0
25.667	3.14				
38.00	38.00		Zero Out: Stream #1	0.1	0.0
38.00	38.00		Zero Out: Stream #2	3.8	0.0
38.00	38.00		Zero Out: Stream #3	11.3	0.0
38.00	38.00		Zero Out: Stream #4	0.0	0.0
40.00	51.00		Subarea (UH) Added to Stream #1	0.0	31.9
16.417					
51.00	51.00		Flow-Through Basin: Stream #1	31.9	0.0
26.000	5.38				
52.00	58.00		Subarea (UH) Added to Stream #2	0.0	16.3
16.500					
58.00	58.00		Flow-Through Basin: Stream #2	16.3	1.2
19.167	2.24				
70.00	98.00		Subarea (UH) Added to Stream #3	0.0	51.2
16.750					
98.00	98.00		Flow-Through Basin: Stream #3	51.2	2.4
23.333	12.09				
110.00	153.00		Subarea (UH) Added to Stream #4	0.0	105.3
17.000					

	153.00	153.00	Flow-Through Basin: Stream #4		105.3	0.1	
32.500		36.91					
+-----+-----+-----+-----+-----+-----+							
	200.00	236.00	Subarea (UH) Added to Stream #5		0.0	105.5	
16.667							
	236.00	236.00	Flow-Through Basin: Stream #5		105.5	0.0	
29.583		27.95					
+-----+-----+-----+-----+-----+-----+							
-----+-----+-----+-----+-----+-----+							
Notes: 1 = BASIN MODEL VOLUME EXCEEDED; 2 = TIME IS AT END OF 5-MINUTE UNIT INTERVAL							
3 = RUNOFF ESTIMATES DO NOT EXTEND PAST 2 DAYS AFTER THE PEAK DAY OF THE DESIGN STORM							
+-----+-----+-----+-----+-----+-----+							
-----+-----+-----+-----+-----+-----+							

END OF FLOODSCx ROUTING ANALYSIS

APPENDIX D

Detailed Cost Estimates

Master Plan of Storm Drainage for the City of McFarland
West Watershed, 10-Year, SUBAREA A
Nodes 1 - 11
Street: Taylor Avenue

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 18" RCP	FT	1196	\$140	\$167,440
2	Manhole	EA	3	\$4,700	\$14,100
3	Catch Basin	EA	2	\$5,000	\$10,000
4	Junction Structure	EA	2	\$2,000	\$4,000
5	Utility Relocation Allowance	LS	1	\$39,200	\$39,200
6	Remove 18" RCP	FT	0	\$21	\$0
7	Traffic Control	LS	1	\$5,900	\$5,900
8	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
9	Mobilization (10%)	LS	1	\$24,600	\$24,600
10	Miscellaneous Items (10%)	LS	1	\$27,100	\$27,100
SUBTOTAL (CONSTRUCTION)					\$297,340
11	Engineering and Design (8%)	LS	1	\$23,800	\$23,800
12	Surveying (1%)	LS	1	\$3,000	\$3,000
13	Construction Management (6%)	LS	1	\$17,900	\$17,900
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$44,700
SUBTOTAL COST					\$342,040
CONTINGENCY 20%					\$68,408
TOTAL PROJECT					\$410,000

Master Plan of Storm Drainage for the City of McFarland
West Watershed, 10-Year, SUBAREA B
Nodes 15 - 26
Street: --

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
SUBTOTAL (CONSTRUCTION)					\$0
1	Engineering and Design (8%)	LS	1	\$0	\$0
2	Surveying (1%)	LS	1	\$0	\$0
3	Construction Management (6%)	LS	1	\$0	\$0
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$0
SUBTOTAL COST					\$0
CONTINGENCY 20%					\$0
TOTAL PROJECT					\$0

*New Storm Drain

Master Plan of Storm Drainage for the City of McFarland
West Watershed, 10-Year, SUBAREA C1 & C2
Nodes 30 - 37
Street: Taylor Avenue

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 18" RCP	FT	705	\$140	\$98,700
2	Manhole	EA	2	\$4,700	\$9,400
3	Catch Basin	EA	1	\$5,000	\$5,000
4	Junction Structure	EA	1	\$2,000	\$2,000
5	Utility Relocation Allowance	LS	1	\$23,100	\$23,100
6	Remove 18" RCP	FT	0	\$21	\$0
7	Traffic Control	LS	1	\$3,500	\$3,500
8	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
9	Mobilization (10%)	LS	1	\$14,700	\$14,700
10	Miscellaneous Items (10%)	LS	1	\$16,200	\$16,200
SUBTOTAL (CONSTRUCTION)					\$177,600
11	Engineering and Design (8%)	LS	1	\$14,300	\$14,300
12	Surveying (1%)	LS	1	\$1,800	\$1,800
13	Construction Management (6%)	LS	1	\$10,700	\$10,700
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$26,800
SUBTOTAL COST					\$204,400
CONTINGENCY 20%					\$40,880
TOTAL PROJECT					\$245,000

Master Plan of Storm Drainage for the City of McFarland
West Watershed, 10-Year, SUBAREA D1 & D2
Nodes 40 - 58
Street: --

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
SUBTOTAL (CONSTRUCTION)					\$0
1	Engineering and Design (8%)	LS	1	\$0	\$0
2	Surveying (1%)	LS	1	\$0	\$0
3	Construction Management (6%)	LS	1	\$0	\$0
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$0
SUBTOTAL COST					\$0
CONTINGENCY 20%					\$0
TOTAL PROJECT					\$0

*New Storm Drain

Master Plan of Storm Drainage for the City of McFarland
West Watershed, 10-Year, SUBAREA E
Nodes 70 - 98
Street: Kern Avenue, Perkins Avenue, and Garzoli Avenue

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 18" RCP	FT	1064	\$140	\$148,960
2	Install 24" RCP	FT	1122	\$165	\$185,130
3	Install 30" RCP	FT	534	\$180	\$96,120
4	Install 36" RCP	FT	1181	\$250	\$295,250
5	Manhole	EA	13	\$4,700	\$61,100
6	Catch Basin	EA	7	\$5,000	\$35,000
7	Junction Structure	EA	7	\$2,000	\$14,000
8	Utility Relocation Allowance	LS	1	\$167,200	\$167,200
9	Remove 24" RCP	FT	1181	\$24.75	\$29,230
10	Traffic Control	LS	1	\$26,000	\$26,000
11	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
12	Mobilization (10%)	LS	1	\$106,300	\$106,300
13	Miscellaneous Items (10%)	LS	1	\$117,000	\$117,000
SUBTOTAL (CONSTRUCTION)					\$1,286,290
14	Engineering and Design (8%)	LS	1	\$103,000	\$103,000
15	Surveying (1%)	LS	1	\$12,900	\$12,900
16	Construction Management (6%)	LS	1	\$77,200	\$77,200
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$193,100
SUBTOTAL COST					\$1,479,390
CONTINGENCY 20%					\$295,878
TOTAL PROJECT					\$1,775,000

Master Plan of Storm Drainage for the City of McFarland
West Watershed, 10-Year, SUBAREA F
Nodes 110 - 153

Street: Sherwood Avenue, 2nd Street, 3rd Street, Davis Road, Kala Loop, and Elmo Highway

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 18" RCP	FT	2417	\$165	\$398,805
2	Install 24" RCP	FT	1070	\$365	\$390,550
3	Install 30" RCP	FT	3005	\$425	\$1,277,125
4	Install 42" RCP	FT	1484	\$490	\$727,160
5	Manhole	EA	26	\$4,700	\$122,200
6	Catch Basin	EA	15	\$5,000	\$75,000
7	Junction Structure	EA	15	\$2,000	\$30,000
8	Utility Relocation Allowance	LS	1	\$604,200	\$604,200
9	Remove 24" RCP	FT	451	\$24.75	\$11,162
10	Traffic Control	LS	1	\$91,000	\$91,000
11	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
12	Mobilization (10%)	LS	1	\$373,300	\$373,300
13	Miscellaneous Items (10%)	LS	1	\$410,600	\$410,600
SUBTOTAL (CONSTRUCTION)					\$4,516,102
14	Engineering and Design (8%)	LS	1	\$361,300	\$361,300
15	Surveying (1%)	LS	1	\$45,200	\$45,200
16	Construction Management (6%)	LS	1	\$271,000	\$271,000
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$677,500
SUBTOTAL COST					\$5,193,602
CONTINGENCY 20%					\$1,038,720
TOTAL PROJECT					\$6,232,000

**Master Plan of Storm Drainage for City of McFarland
West Watershed, 10-Year**

Total Cost - SubAreas A - F

SubArea	Total Project Cost
A	\$410,000
B	\$0
C	\$245,000
D	\$0
E	\$1,775,000
F	\$6,232,000
Total	\$8,662,000

**Master Plan of Storm Drainage for the City of McFarland
East Watershed, 10-Year, SUBAREA K
Nodes 200 - 236
Street: Browning Road and Perkins Avenue**

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 24" RCP	FT	1832	\$165	\$302,280
2	Install 30" RCP	FT	2731	\$365	\$996,815
3	Install 5.5' x 2' RCB	FT	788	\$290	\$228,520
4	Manhole	EA	17	\$4,700	\$79,900
5	Catch Basin	EA	10	\$5,000	\$50,000
6	Junction Structure	EA	10	\$2,000	\$20,000
7	Utility Relocation Allowance	LS	1	\$335,600	\$335,600
8	Remove 24" RCP	FT	788	\$24.75	\$19,503
9	Traffic Control	LS	1	\$51,000	\$51,000
10	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
11	Mobilization (10%)	LS	1	\$208,900	\$208,900
12	Miscellaneous Items (10%)	LS	1	\$229,800	\$229,800
SUBTOTAL (CONSTRUCTION)					\$2,527,318
13	Engineering and Design (8%)	LS	1	\$202,200	\$202,200
14	Surveying (1%)	LS	1	\$25,300	\$25,300
15	Construction Management (6%)	LS	1	\$151,700	\$151,700
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$379,200
SUBTOTAL COST					\$2,906,518
CONTINGENCY				20%	\$581,304
TOTAL PROJECT					\$3,488,000

**Master Plan of Storm Drainage for City of McFarland
East Watershed, 10-Year**

Total Cost - SubAreas K

SubArea	Total Project Cost
K	\$3,488,000
Total	\$3,488,000

**Master Plan of Storm Drainage for City of McFarland
West and East Watershed, 10-Year
Grand Total
SubAreas A - K**

Areas	Total Project Cost
West Watershed	\$8,662,000
East Watershed	\$3,488,000
Total	\$12,150,000

Master Plan of Storm Drainage for the City of McFarland

West Watershed, 100-Year, SUBAREA A

Nodes 1 - 11

Street: Frontage Road and Taylor Avenue

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 24" RCP	FT	316	\$165	\$52,140
2	Install 30" RCP	FT	1785	\$180	\$321,300
3	Manhole	EA	7	\$4,700	\$32,900
4	Catch Basin	EA	4	\$5,000	\$20,000
5	Junction Structure	EA	4	\$2,000	\$8,000
6	Utility Relocation Allowance	LS	1	\$86,900	\$86,900
7	Remove 18" RCP	FT	0	\$21	\$0
8	Traffic Control	LS	1	\$13,100	\$13,100
9	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
10	Mobilization (10%)	LS	1	\$54,000	\$54,000
11	Miscellaneous Items (10%)	LS	1	\$59,400	\$59,400
SUBTOTAL (CONSTRUCTION)					\$652,740
12	Engineering and Design (8%)	LS	1	\$52,300	\$52,300
13	Surveying (1%)	LS	1	\$6,600	\$6,600
14	Construction Management (6%)	LS	1	\$39,200	\$39,200
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$98,100
SUBTOTAL COST					\$750,840
CONTINGENCY 20%					\$150,168
TOTAL PROJECT					\$901,000

Master Plan of Storm Drainage for the City of McFarland

West Watershed, 100-Year, SUBAREA B

Nodes 15 - 26

Street: --

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
SUBTOTAL (CONSTRUCTION)					\$0
1	Engineering and Design (8%)	LS	1	\$0	\$0
2	Surveying (1%)	LS	1	\$0	\$0
3	Construction Management (6%)	LS	1	\$0	\$0
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$0
SUBTOTAL COST					\$0
CONTINGENCY 20%					\$0
TOTAL PROJECT					\$0

Master Plan of Storm Drainage for the City of McFarland

West Watershed, 100-Year, SUBAREA C1 & C2

Nodes 30 - 37

Street: Taylor Avenue

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 18" RCP	FT	1071	\$140	\$149,940
2	Install 30" RCP	FT	705	\$180	\$126,900
3	Manhole	EA	5	\$4,700	\$23,500
4	Catch Basin	EA	3	\$5,000	\$15,000
5	Junction Structure	EA	3	\$2,000	\$6,000
6	Utility Relocation Allowance	LS	1	\$64,300	\$64,300
7	Remove 18" RCP	FT	0	\$21	\$0
8	Traffic Control	LS	1	\$9,700	\$9,700
9	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
10	Mobilization (10%)	LS	1	\$40,100	\$40,100
11	Miscellaneous Items (10%)	LS	1	\$44,100	\$44,100
SUBTOTAL (CONSTRUCTION)					\$484,540
12	Engineering and Design (8%)	LS	1	\$38,800	\$38,800
13	Surveying (1%)	LS	1	\$4,900	\$4,900
14	Construction Management (6%)	LS	1	\$29,100	\$29,100
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$72,800
SUBTOTAL COST					\$557,340
CONTINGENCY 20%					\$111,468
TOTAL PROJECT					\$669,000

Master Plan of Storm Drainage for the City of McFarland

West Watershed, 100-Year, SUBAREA D1 & D2

Nodes 40 - 58

Street: Garzoli Avenue and Kyra Avenue

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 18" RCP	FT	498	\$140	\$69,720
2	Install 24" RCP	FT	2145	\$165	\$353,925
3	Manhole	EA	8	\$4,700	\$37,600
4	Catch Basin	EA	5	\$5,000	\$25,000
5	Junction Structure	EA	5	\$2,000	\$10,000
6	Utility Relocation Allowance	LS	1	\$99,300	\$99,300
7	Remove 18" RCP	FT	0	\$21	\$0
8	Traffic Control	LS	1	\$14,900	\$14,900
9	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
10	Mobilization (10%)	LS	1	\$61,600	\$61,600
11	Miscellaneous Items (10%)	LS	1	\$67,800	\$67,800
SUBTOTAL (CONSTRUCTION)					\$744,845
12	Engineering and Design (8%)	LS	1	\$59,600	\$59,600
13	Surveying (1%)	LS	1	\$7,500	\$7,500
14	Construction Management (6%)	LS	1	\$44,700	\$44,700
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$111,800
SUBTOTAL COST					\$856,645
CONTINGENCY 20%					\$171,329
TOTAL PROJECT					\$1,028,000

Master Plan of Storm Drainage for the City of McFarland

West Watershed, 100-Year, SUBAREA E

Nodes 70 - 98

Street: Kern Avenue, Perkins Avenue, and Garzoli Avenue

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 18" RCP	FT	494	\$140	\$69,160
2	Install 30" RCP	FT	1692	\$180	\$304,560
3	Install 42" RCP	FT	534	\$275	\$146,850
4	Install 48" RCP	FT	1181	\$290	\$342,490
5	Manhole	EA	13	\$4,700	\$61,100
6	Catch Basin	EA	7	\$5,000	\$35,000
7	Junction Structure	EA	7	\$2,000	\$14,000
8	Utility Relocation Allowance	LS	1	\$194,700	\$194,700
9	Remove 24" RCP	FT	1181	\$24.75	\$29,230
10	Traffic Control	LS	1	\$30,100	\$30,100
11	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
12	Mobilization (10%)	LS	1	\$123,300	\$123,300
13	Miscellaneous Items (10%)	LS	1	\$135,600	\$135,600
SUBTOTAL (CONSTRUCTION)					\$1,491,090
14	Engineering and Design (8%)	LS	1	\$119,300	\$119,300
15	Surveying (1%)	LS	1	\$15,000	\$15,000
16	Construction Management (6%)	LS	1	\$89,500	\$89,500
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$223,800
SUBTOTAL COST					\$1,714,890
CONTINGENCY				20%	\$342,978
TOTAL PROJECT					\$2,058,000

Master Plan of Storm Drainage for the City of McFarland

West Watershed, 100-Year, SUBAREA F

Nodes 110 - 153

Street: Mast Ave, Sherwood Ave, 2nd Street, Kern Ave, 3rd Street, 5th Street, Davis Rd, and Elmo Highway

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 18" RCP	FT	1251	\$140	\$175,140
2	Install 24" RCP	FT	6112	\$165	\$1,008,480
3	Install 30" RCP	FT	3066	\$180	\$551,880
4	Install 42" RCP	FT	1336	\$275	\$367,400
5	Install 48" RCP	FT	3154	\$290	\$914,660
6	Manhole	EA	49	\$4,700	\$230,300
7	Catch Basin	EA	29	\$5,000	\$145,000
8	Junction Structure	EA	29	\$2,000	\$58,000
9	Utility Relocation Allowance	LS	1	\$690,200	\$690,200
10	Remove 18" RCP	FT	970	\$21	\$20,370
11	Remove 24" RCP	FT	451	\$24.75	\$11,162
12	Traffic Control	LS	1	\$104,500	\$104,500
13	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
14	Mobilization (10%)	LS	1	\$428,300	\$428,300
15	Miscellaneous Items (10%)	LS	1	\$471,100	\$471,100
SUBTOTAL (CONSTRUCTION)					\$5,181,492
16	Engineering and Design (8%)	LS	1	\$414,600	\$414,600
17	Surveying (1%)	LS	1	\$51,900	\$51,900
18	Construction Management (6%)	LS	1	\$310,900	\$310,900
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$777,400
SUBTOTAL COST					\$5,958,892
CONTINGENCY				20%	\$1,191,778
TOTAL PROJECT					\$7,151,000

Master Plan of Storm Drainage for the City of McFarland
West Watershed, 100-Year

Total Cost - SubAreas A - F

SubArea	Total Project Cost
A	\$901,000
B	\$0
C	\$669,000
D	\$1,028,000
E	\$2,058,000
F	\$7,151,000
Total	\$11,807,000

Master Plan of Storm Drainage for the City of McFarland
East Watershed, 100-Year, SUBAREA K
Nodes 200 - 236
Street: Browning Road and Perkins Avenue

REPLACEMENT COST ESTIMATE

Item No.	Item Description	PROJECT TOTAL			
		Unit of Measure	Estimated Quantities	Unit Price	Item Total
1	Install 24" RCP	FT	328	\$165	\$54,120
2	Install 36" RCP	FT	1148	\$250	\$287,000
3	Install 42" RCP	FT	3415	\$275	\$939,125
4	Install 6.5' x 3' RCB	FT	788	\$365	\$287,620
5	Install 10' x 3' Trapezoidal Channel	FT	417	\$365	\$152,205
6	Manhole	EA	20	\$4,700	\$94,000
7	Catch Basin	EA	12	\$5,000	\$60,000
8	Junction Structure	EA	12	\$2,000	\$24,000
9	Utility Relocation Allowance	LS	1	\$379,700	\$379,700
10	Remove 24" RCP	FT	788	\$24.75	\$19,503
11	Remove 8' x 3' Trapezoidal Channel	FT	417	\$45	\$18,765
12	Traffic Control	LS	1	\$58,100	\$58,100
13	Prepare Storm Water Pollution Prevention Plan	LS	1	\$5,000	\$5,000
14	Mobilization (10%)	LS	1	\$238,000	\$238,000
15	Miscellaneous Items (10%)	LS	1	\$261,800	\$261,800
SUBTOTAL (CONSTRUCTION)					\$2,878,938
16	Engineering and Design (8%)	LS	1	\$230,400	\$230,400
17	Surveying (1%)	LS	1	\$28,800	\$28,800
18	Construction Management (6%)	LS	1	\$172,800	\$172,800
SUBTOTAL (ENGINEERING AND CONSTRUCTION ADMINISTRATION)					\$432,000
SUBTOTAL COST					\$3,310,938
CONTINGENCY				20%	\$662,188
TOTAL PROJECT					\$3,973,000

Master Plan of Storm Drainage for the City of McFarland
East Watershed, 100-Year

Total Cost - SubAreas K

SubArea	Total Project Cost
K	\$3,973,000
Total	\$3,973,000

Master Plan of Storm Drainage for the City of McFarland
West and East Watershed, 100-Year
Grand Total
SubAreas A - K

Areas	Total Project Cost
West Watershed	\$11,807,000
East Watershed	\$3,973,000
Total	\$15,780,000