CAMPUS PARK PROJECT

APPENDIX L

HYDROLOGY AND WATER QUALITY

SPA 03-008, GPA 03-004, R03-014, VTM 5338 RPL7,
S 07-030, S 07-031, LOG No. 03-02-059
State Clearinghouse No. 2005011092

for the

DRAFT FINAL SUBSEQUENT
ENVIRONMENTAL IMPACT REPORT

DECEMBER 3, 2010

FINAL ENVIRONMENTAL IMPACT REPORT
HYDROLOGY AND HYDRAULICS STUDY
INFORMATION FOR THE READER

This document consists of the Hydrology and Hydraulics Study (Hydrology Study) for the Campus Park Project (Proposed Project or Project) and analyzes hydrologic-related elements associated with construction and operation of the Project. Since circulation of the Project Draft Environmental Impact Report (EIR) and associated technical reports, refinements in Project description have been implemented in response to comments received.

The majority of Project refinements occur west of future Horse Ranch Creek Road and all of them would be south of proposed Harvest Glen Lane. The majority of the developed uses and their construction footprints (residential, office professional, recreational and commercial) remain the same as previously analyzed.

South of future Harvest Glen Lane and west of future Horse Ranch Creek Road, the Proposed Project has been refined to: (1) eliminate some development areas, (2) modify specifics of development detail in some areas, and (3) eliminate the potential for connection to an off-site future wastewater treatment plant (WTP) to be constructed by others. Specifics of road design improvements also vary.

Overall, primary design changes result in 325 fewer multi-family homes (a reduction of 41 percent), and an increase in the biological open space preserve of 20.7 acres (or 11 percent). See Figure A for a comparison of the Project evaluated in the Draft EIR with the current plan.

Project refinements relevant to this technical report are addressed below.

Relevant Refinements to Project Description

The Draft EIR included two multi-family residential areas (MF-1 and MF-4) west of future Horse Ranch Creek Road and north of SR 76. These areas were proposed to contain a total of 300 residential units sited on a total of 21.1 acres. Both have been eliminated and now would largely be in open space. Within the MF area east of future Horse Ranch Creek Road and north of future Harvest Glen Lane, Draft EIR MF-3 has been renamed MF-1. The style of housing in MF-2 has been changed to match that of new MF-1, and the density of MF housing in both MF-1 and MF-2 has been reduced.

A 2.4-acre detention basin was previously located south of (now eliminated) multi-family housing west of Horse Ranch Creek Road. With the elimination of that housing, this basin has been relocated to the north, and the basin size and shape have been modified to encompass a surface area of approximately 5.2 acres (although the detention capacity has not changed as the current basin is shallower). Similarly, a 2.6-acre potential wet weather storage pond associated with a previous wastewater management option would be eliminated (along with any associated impacts), as would any utility lines required to tie into the proposed off-site WTP under this option.

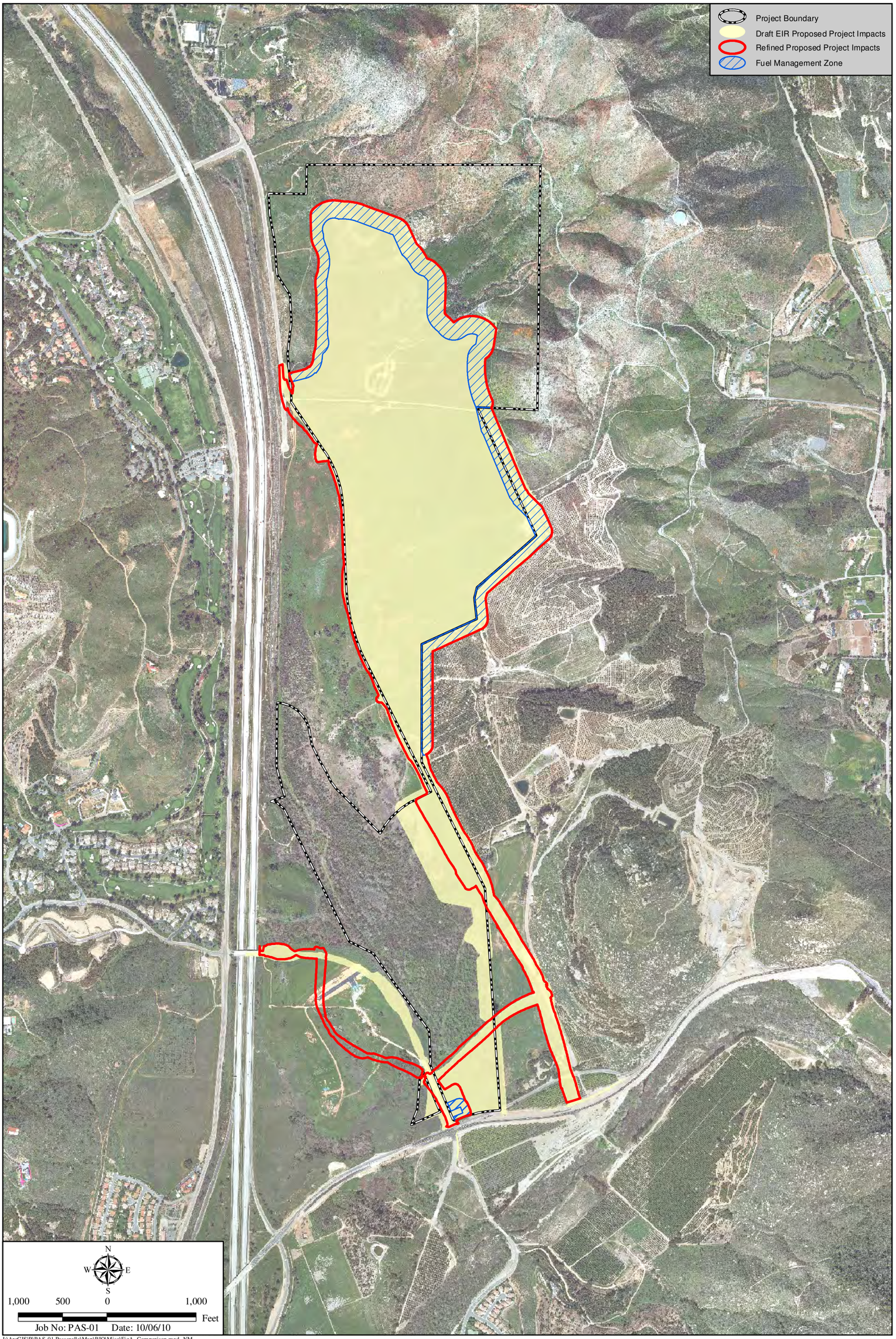
A sewer lift or pump station and trail staging area would be moved from an isolated small Project parcel west of future Pankey Road and north of SR 76 to east of future Pankey Road, in the old area of MF-4.

Changes have been made to specific design of an off-site portion of future Pala Mesa Drive, Pankey Road and on-site Pankey Place. With regard to Pala Mesa Drive/Pankey Road, modifications resulted from a request by the abutting Campus Park West Project to shift a portion of the alignment, and this shift has been worked out in coordination with the Department of Public Works. For on-site Pankey Place, the modification is related to deletion of MF-4 on the south side of the road, and retention of open space.

Technical Analysis Modifications Based on Project Description Refinements

With regard to hydrologic and hydraulic considerations, the described changes to the Project would result in an overall reduction of new impervious surface areas and associated Project-related runoff generation. While the on-site detention basin, Pala Mesa Drive/Panky Road and Pankey Place have been relocated/reconfigured as noted, the related basin capacity and hydrologic/hydraulic conditions associated the on- and off-site roadways would remain essentially the same and Project Environmental Design Considerations committed to as part of the Proposed Project would be implemented. Specifically, the modified detention basin would be adequate to accommodate all Project-related runoff, with no change to the related conclusions provided in the attached Hydrology Study. Similarly, the modified design of the two noted roadways would accommodate projected hydrologic/hydraulic conditions in a similar fashion as described in the Hydrology Study. Accordingly, while specifics of site design would be updated to reflect the refined Project prior to issuance of Project grading permits, the attached report has not been changed and the associated conclusions regarding impacts related to runoff generation, drainage patterns/directions, flow regulation, hydromodification, flooding potential, and the capacity of existing and proposed storm drain system facilities are still accurate. That is, the proposed Project and storm drain system design would accommodate projected flow rates and amounts, with no significant Project-related hydrologic/hydrologic impacts to on- or off-site areas or facilities. No change to environmental design considerations or significance conclusions reached in conformance with the California Environmental Quality Act would occur and no change is required to the attached technical analysis.

Each of the above-cited and additional specific revisions are now included as part of the public record and will be before the Board of Supervisors during their consideration of the Project.



I:\ArcGIS\P\PAS-01 Passarelle\Map\BIO\Misc\FigA_Comparison.mxd -NM

Impact Comparison

CAMPUS PARK

HELIX

Figure A

PRELIMINARY HYDROLOGY AND HYDRAULICS STUDY

A CEQA LEVEL PRELIMINARY HYDROLOGY & HYDRAULICS STUDY

FOR:

CAMPUS PARK

TM 5338 RPL6

San Diego, California

Prepared for:

Passerelle, LLC
402 W. Broadway, Suite 1320
San Diego, CA 92101

Prepared by:

Landmark Consulting
9555 Genesee Avenue, Suite 200
San Diego, Ca 92121
Tel: 858-587-8070
JN 6-14
REV. DATE: 9-15-09



TABLE OF CONTENTS

SECTION 1: VICINITY MAP & SITE PLAN

SECTION 2: INTRODUCTION

SECTION 3: METHOD OF ANALYSIS

SECTION 4: EXISTING UNDISTURBED UPSTREAM (EASTERLY) BASINS - 100-YEAR RATIONAL METHOD HYDROLOGY CALCS

SECTION 4A: CAMPUS PARK UPSTREAM – HYDROLOGY MAP (OFF-SITE)

SECTION 5: PRE-DEVELOPMENT CONDITIONS (ONSITE) – 100-YEAR RATIONAL METHOD HYDROLOGY CALCS

SECTION 5A: PRE-DEVELOPMENT CONDITIONS – HYDROLOGY MAP (ON-SITE)

SECTION 6: POST-DEVELOPMENT CONDITIONS (ONSITE) – 100-YEAR RATIONAL METHOD HYDROLOGY CALCS

SECTION 6A: BASIN 100
SECTION 6B: BYPASS BASIN 400
SECTION 6C: BASIN 200
SECTION 6D: BASIN 500
SECTION 6E: BASIN 300
SECTION 6F: POST-DEVELOPMENT CONDITIONS – HYDROLOGY MAP (ON-SITE)

SECTION 7: OFFSITE INTERSECTIONS ANALYSIS

SECTION 7A: OFF-SITE INTERSECTION HYDROLOGY AND HYDRAULICS CALCULATIONS
SECTION 7B: OFF-SITE INTERSECTION HYDROLOGY MAPS
MAP 7-B-1: PALA RD. @ I-15, OLD HWY 395 @ PALA RD.
MAP 7-B-4: RECHE RD. @ OLD HWY 395 & CANONITA RD @ OLD HWY 395

SECTION 8: HORSE RANCH CREEK 100-YEAR NRCS HYDROLOGIC METHOD

SECTION 8A: HEC HMS ANALYSIS FOR PRE AND POST-DEVELOPMENT CONDITIONS
SECTION 8B: PRE-DEVELOPMENT CONDITIONS HORSE RANCH CREEK HEC HMS HYDROLOGY/DEVELOPMENT TYPE MAP
SECTION 8C: POST-DEVELOPMENT CONDITIONS HORSE RANCH CREEK HEC HMS HYDROLOGY/DEVELOPMENT TYPE MAP
SECTION 8D: CURVE NUMBER (CN) CALCULATION

SECTION 9: 100-YEAR HYDRAULIC ANALYSIS

SECTION 9A: HORSE RANCH CREEK HEC-RAS CALCS - PRE-DEVELOPMENT CONDITIONS
CALCULATIONS AND CROSS-SECTIONS
100-YEAR FLOODPLAIN LIMITS EXHIBIT
SECTION 9B: HORSE RANCH CREEK HEC-RAS CALCS - POST-DEVELOPMENT CONDITIONS
CALCULATIONS AND CROSS-SECTIONS
100-YEAR FLOODPLAIN LIMITS EXHIBIT
SECTION 9C: HORSE RANCH CREEK HEC-RAS CALCS - POST-DEVELOPMENT CAPACITY
CALCULATIONS AND CROSS-SECTIONS
100-YEAR FLOODPLAIN LIMITS EXHIBIT
SECTION 9D: EXISTING CULVERT/BRIDGE HYDRAULIC CALCS
PRESSURE FLOW HYDRAULICS FOR EX. 8'X5' CULVERT
HYDRAULIC CALCS FOR EXISTING BRIDGES UNDERCROSSING
SECTION 9E: HEC-RAS ROUGHNESS COEFFICIENT ANALYSIS

SECTION 10: DETENTION BASIN ANALYSIS

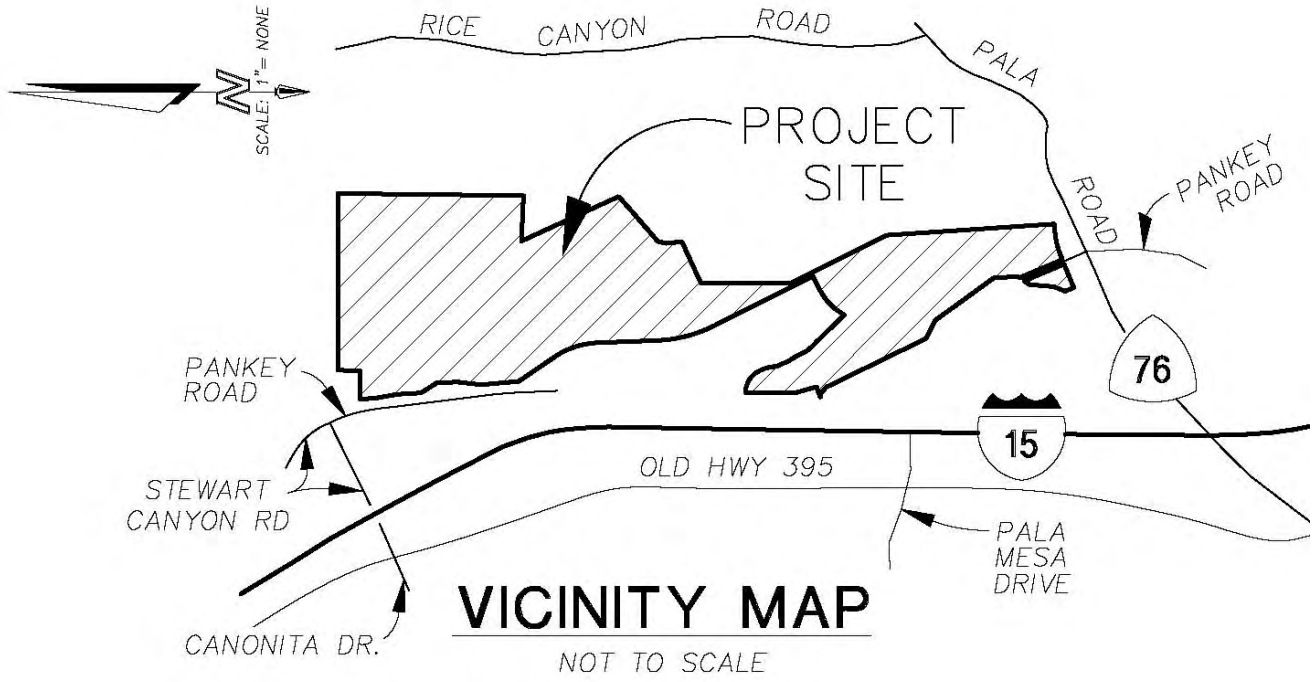
SECTION 10A: DETENTION BASIN ROUTING CALCS
SECTION 10B: DETENTION BASIN OUTLET HYDRAULIC CALCS

SECTION 11: SUMMARY

SECTION 11A: PRE AND POST DEVELOPMENT PROJECT DISCHARGE POINT SUMMARY EXHIBITS

SECTION 12: APPENDIX

HYDROLOGIC SOILS GROUP MAP
100-YEAR, 6-HOUR & 24-HOUR RAINFALL ISOPLUVIAL MAPS
RUNOFF COEFFICIENTS FOR URBAN AREAS TABLE
LAND USE SITE PLAN AND RUNOFF COEFFICIENTS EXHIBIT
LAND USE SUMMARY & C VALUE CHART(ON-SITE)
LAND USE & CURVE NUMBER WORKSHEETS FOR RUNOFF CURVE NUMBER CALCULATIONS
CHANNEL MANNINGS ROUGHNESS COEFFICIENTS CHART
EXISTING CANTRANS CHANNEL AS BUILT PLANS
FHWA MEMORANDUM – Highway Embankments versus Levee and other Flood Control Structures



SECTION 1:
VICINITY MAP

SECTION 2:
INTRODUCTION

The project is located on the northerly side of Pala Road (SR-76), between Interstate 15 and Rice Canyon Road. The project consists of approximately 416.1 acres of mixed-use development including 113.8 acres of single family dwelling units, 45.4 acres of multi-family dwelling units, 11.5 acres of professional office development, 8.1 acres of town center, 215.4 acres of parks and open space, 0.2 acres of pump station area as well as 21.7 acres of major circulation roads.

The project site is located at the downstream end of an approximately 7,500 acre upstream drainage basin. An existing Caltrans channel conveys runoff from this upstream basin southerly along a portion of the westerly boundary of this project. The runoff from this upstream basin creates the Horse Ranch Creek and floodplain which eventually confluences with the San Luis Rey River. (Please see Horse Ranch Creek Upstream Hydrology/Development Type Maps for the Pre and Post-Development Conditions in Section 8). The existing Horse Ranch Creek floodway and floodplain have neither been previously mapped by the County nor by FEMA and, furthermore, they are not shown on any floodplain maps approved by the Board of Supervisors. As such, the Horse Ranch Creek floodway and floodplain do not meet the Resource Protection Ordinance's definition of floodway or floodplain and a RPO analysis is not included with this report.

Under the pre-development conditions (see Campus Park Upstream - Hydrology Map in Section 4 and Pre-Development Conditions - Hydrology Map in Section 5), 287.6 acres of natural terrain in the northerly portion of the watershed (Basin 100) drains westerly through an existing 5'x8' box culvert crossing under existing Pankey Road (north). Under existing conditions, this existing box culvert flows under pressure during the 100-year storm. Past this box culvert, the existing runoff temporarily leaves our project boundary and flows into an existing, manufactured, earthen, trapezoidal drainage channel (i.e. Horse Ranch Creek) westerly of our project boundary. This channel was constructed by Caltrans as part of the Interstate 15 construction. The runoff from existing Basin 100 then confluences with the upstream Horse Ranch Creek watershed (Basins A & B) of 5,850 acres. The majority of the Horse Ranch Creek upstream basin is undeveloped and/or low density residential (see the Horse Ranch Creek Upstream Hydrology Map in Section 8C). Horse Ranch Creek then conveys the runoff southerly approximately 3,600 feet, opens up from the manufactured channel into a wide, shallow, open area and discharges onto natural terrain, within future biological open space Lot V (depicted as OS-2 on the Land Use Site Plan included in Section 12) on the southern half of the site.

The southerly portion of the watershed (Basin 200 thru 700) drain southwesterly into the Horse Ranch Creek floodplain and the above mentioned natural terrain (future Lot V) and confluences with the runoff within Horse Ranch Creek (Basin 100 and the upstream Horse Ranch Creek watershed). The runoff then flows southerly in the wide, shallow, open area of Horse Ranch Creek and then, necks down through an existing bridge crossing near the northerly terminus of existing Pankey Road (south) into a more well defined drainage channel of Horse Ranch Creek and then, crosses SR-76 (Pala Road) through another existing bridge crossing. Horse Ranch Creek then flows southwesterly approximately 2,000 feet until it confluences with San Luis Rey River. At this point, the Horse Ranch Creek watershed is about 11.6 sq. mi.

Under the post-development conditions, the project site is divided into 5 basins – Basins 100 thru 500 (see Post-Development Conditions - Hydrology Map in Section 6). The runoff from the northerly tip of the site creates Basin 100. The runoff from the upstream open space areas are collected in a series of brow ditches which is then conveyed through Basin 100 via an underground storm drain system into the existing creek on the west side of Basin 100 that eventually leads to the existing Pankey Road (north) box culvert. A separate underground storm drain system collects and conveys the runoff from the improved portions of this basin to the downstream end of Basin 100. The first flush runoff is diverted from the large storm flows with a low flow pipe exiting the most downstream curb inlet (at Node 140) into a engineered grass-lined swale within HOA Lot CC located at the southwesterly corner of Frigatebird Road and Jaeger Street before being outlet onto the undisturbed terrain

along the westerly project boundary. After confluence with the runoff in the existing creek on the west side of Basin 100, the basin runoff then enters an existing box culvert under existing Pankey Road (north), exits the project boundary and outlets into the existing drainage channel (Horse Ranch Creek) along the westerly project boundary (at Node 174). At this point, the discharge confluences with the upstream Horse Ranch Creek watershed of 9.1 sq. mi. and then, flows southerly in the Caltrans channel adjacent to I-15.

A portion of the upstream natural watershed in the northeasterly portion of the site (Bypass Basin 400) drains westerly, in natural swales, to the northerly tip of the project site (at Node 402). The discharge is then collected into an underground storm drain system that flows through the proposed development, without comingling with the on-site runoff (for water quality considerations), until it confluences with the combined runoff from Basin 100 and the upstream Horse Ranch Creek watershed in the existing drainage channel (Horse Ranch Creek) along the westerly project boundary (at Node 407). This bypass storm drain system also temporarily diverts some of the runoff around the existing box culvert on Pankey Road (north) thereby, reducing the runoff enough through this box culvert so that the existing box culvert adequately handles the 100-year post-development flows without inundating existing Pankey Road.

The largest amount of on-site runoff comes from the middle portion of the site to create Basin 200. The runoff from the upstream open space areas are collected in a series of brow ditches which is then conveyed through an underground storm drain system that also collects and conveys the runoff from the improved portions of this basin. This underground system conveys the runoff from the entire project development (southerly of Basins 100 and 400) southerly within Horse Ranch Creek Road. This runoff (and the runoff from a portion of Basin 300) then discharges into a proposed detention basin located on the westerly side of Horse Ranch Creek Road, just south of the proposed multi-family pad, MF-1. The runoff from MF-1 also discharges directly into this detention basin. The volume detained by the detention basin will mitigate for any increase in runoff due to the proposed development. After the increase in peak volumes are detained in the detention basin, the runoff flows southerly through the southern end of the site through existing Pankey Road (south) bridge crossing and existing SR76 bridge crossing further downstream.

The runoff from the southerly portion of the site creates Basins 300 and 500. The runoff leaving the detention basin (from Basin 200 and a portion of Basin 300), the runoff from Basins 100 & 400, the runoff from the upstream Horse Ranch Creek watershed plus the runoff from the northerly areas of Basin 300 then flow southerly within the wide, shallow, open area of Horse Ranch Creek, collecting additional runoff from other areas in Basin 300 and Basin 500, until Horse Ranch Creek necks down through an existing bridge crossing near the northerly terminus of existing Pankey Road (south) into a more well defined drainage channel of Horse Ranch Creek, crosses SR-76 (Pala Road) through another existing bridge crossing, and, then, exists the project site (at Node 348). With the proposed detention basin, the post-developed peak runoff leaving the subdivision boundary will be less than or equal to the pre-development volumes. Horse Ranch Creek then flows southwesterly approximately 2,000 feet until it confluences with the San Luis Rey River.

This project also requires the widening of several offsite intersections for additional turning lanes (at Old Hwy 395 & Stewart Cyn Rd, at Old Hwy 395 & Reche Rd, at Stewart Cyn Rd & Pankey Rd (north), at Old Hwy 395 & Pala Mesa Dr, at Old Hwy 395 & SR-76, at SR-76 & Pankey Rd (south), at SR-76 & Horse Ranch Creek Rd, and at southbound & northbound on-ramps at SR-76 & I-15. See below for a more detailed discussion of the proposed impacts to the drainage facilities at each of these off-site intersections.

The purpose of this report is to determine preliminary post-development peak runoff rate and volume (for the 100-year storm) to and from the site and compare them to the pre-development levels for the evaluation of the project's impacts to surrounding properties with regard to drainage concentrations, diversions, flooding, erosion and siltation. The effects of building within the limits of the Horse Ranch Creek floodplain will be analyzed to determine if there are any negative flood-related impacts to the Horse Ranch Creek floodplain due to this construction. A HEC-RAS analysis of the Horse Ranch Creek floodplain will be prepared to demonstrate that this construction can be accomplished without detrimental effects to the flood carrying capacity of Horse Ranch

Creek or to the surrounding properties and that the proposed pad elevations at the lower reaches of the floodplain are high enough that the building pads will not be inundated by 100-year flood waters (see Section 9). A HEC-RAS analysis will be run for the pre-development, post-development (i.e. after the construction of TM 5338) and build-out (i.e. after the construction of TM 5338 and the surrounding developments along Horse Ranch Creek: TM 5354, TM 5424 and Palomar College) conditions to compare the impacts to the Horse Ranch Creek floodplain. Additionally, the 100-year flood will be routed through the proposed detention basin (within proposed Lot U) to evaluate the flood mitigating effects the detention basin has in the post-developed condition (see Sections 8).

For this report, it was assumed that any development upstream from this project would have to detain, treat and release the post-development 100-year storm waters such that the quantity, quality and discharge rate & time and location would substantially resemble the pre-development conditions. It is expected that the proposed surrounding developments (TM 5354, TM 5424 and Palomar College) will adhere to the regulation set forth by the San Diego County Drainage Design Manual Section 6.2.1, " ..a detention basin may be required to reduce peak flows to the capacity of the existing downstream facility." The County of San Diego has further stipulated that no increase in runoff is allowed to be discharged from a proposed development and that detention facilities are required for any development to regulate the discharge rate to that under the pre-development conditions. Thus, it is anticipated that the surrounding developments (TM 5354 & TM 5424) will design their own onsite detention facilities to mitigate for any increases in their post-development flows such that no adverse affect will occur to downstream drainage facilities, particularly, the existing bridge crossings under Pankey road (south) and SR-76.

OFF-SITE INTERSECTIONS

As part of this project, several off-site intersections will be improved with additional pavement and improved lane delineation to mitigate the potential impact in traffic volume and flow as a result of the proposed development.

Old Hwy 395 at Stewart Canyon Road (& Canonita Drive):

The proposed improvements consists of the widening and re-striping to accommodate additional lanes on Canonita Drive and Stewart Canyon Road, westerly and easterly of Old Hwy 395, respectively. Also, Old Hwy 395 must be widened on the easterly side to accommodate additional lanes. A new AC berm is proposed along the easterly side of Old Hwy 395. A traffic signal is also proposed for this intersection.

The existing runoff on Old Hwy 395 flows southerly, outletting several times in existing AC spillways, until it reaches the intersection of Stewart Cyn Rd/Canonita Dr. The runoff then splits – the easterly runoff drains down Stewart Cyn Rd and the westerly runoff flows down Canonita Dr. The easterly runoff down Stewart Cyn Rd continues easterly until it reaches two existing curb inlets immediately before the intersection with Pankey Rd (north). The westerly runoff flows about 100' westerly to a low point in Canonita Dr . The runoff on at the northerly low point exists the street via an existing AC spillway. The runoff then crosses Canonita Dr in an existing culvert which outlets to an existing 5' wide concrete channel that flows southerly along the westerly side of Old Hwy 395. The runoff at the southerly low point enters an existing curb inlet which then drains connects to the existing culvert under Canonita Dr and, then into the existing 5' concrete channel .

Even though the existing AC spillway and curb inlet on Canonita Dr will have to be relocated to allow for the road widening, the existing drainage pattern of the roadway will not be altered and the additional pavement is located in existing hardened dirt areas, thus, appreciable additional runoff is not anticipated at this location.

Old Hwy 395 & Reche Rd, Stewart Cyn Rd & Pankey Rd (north):

The only improvements proposed at these intersections is re-striping at Stewart Cyn Rd & Pankey Rd (north) and re-striping & traffic signal installation at Old Hwy 395 & Reche Rd. Therefore, the existing drainage pattern and/or facilities will not be altered in anyway and the proposed improvements to these intersections will have no impact to the existing drainage.

Old Hwy 395 at Pala Mesa Drive:

The improvements consist of the widening of Pala Mesa Drive (westerly of Old Hwy 395), the widening of Old Hwy 395 (northerly & southerly of Pala Mesa Drive), the installation of a traffic signal and the re-striping of this intersection to add additional turning lanes.

A high point exists on Old Hwy 395, approximately 1,700' south of Pala Mesa Drive, and low points exists on Old Hwy 395 north of Pala Mesa Drive (approximately 520' on the east side of Old Hwy 395 and 620' on the west side). The runoff from both sides of Pala Mesa Drive flows towards the intersection with Old Hwy 395, where it confluences with the runoff from Old Hwy 395 and continues northerly along both sides of Old Hwy 395. The runoff from the westerly side of Old Hwy 395 flows northerly along the existing berm, crossing Pala Mesa Drive and discharges into an existing AC spillway which then flows into an existing drainage ditch along the westerly side of Old Hwy 395 (north of Pala Mesa Drive). The runoff on the west side of Old Hwy 395, north of this AC spillway, continues northerly on Old Hwy 395 until it reaches the above referenced low point and exists the street in an existing AC spillway. The runoff from the east side of Old Hwy 395 sheet flows off the edge of pavement into a earthen swale along the existing edge of pavement and flows northerly to an existing drain inlet at the above referenced easterly low point on Old Hwy 395. The easterly runoff then crosses Old Hwy 395 in an existing 17" CMP culvert that outlets into the existing drainage ditch on the westerly side of

Old Hwy 395. The combined runoff then flows westerly in an existing wide earthen ditch.

Due to the road widening, the existing AC spillway at the low point on the west side of Old Hwy 395 will need to be reconstructed. The new AC spillway will outlet at the some location as the existing spillway. A new AC spillway will also be required on the easterly low point on Old Hwy 395 due to the new berm proposed along the easterly edge of pavement. This spillway will direct the street runoff to the existing drain inlet & CMP culvert. A curb inlet is proposed on Old Hwy 395 at the southeasterly curb return with Pala Mesa Drive. This curb inlet will pick up the runoff from the east side of Old Hwy 395 before it crosses Pala Mesa Drive. This curb inlet will outlet to the existing drainage ditch along the west side of Old Hwy 395 via a proposed storm drain culvert. Also, due to the road widening on Old Hwy 395, a fill slope will be required on the west side of Old Hwy 395, north of Pala Mesa Dr. In order to keep the fill slope out of the existing drainage ditch, along the westerly side of Old Hwy 395, a retaining wall is proposed at the toe of this fill slope.

Due to the fact that the widening in this area is relatively minimal, and due to the fact that the widening occurs is very hard compacted dirt areas, the additional amount of runoff generated by this construction should be minimal. Any proposed drainage facilities and any undersized existing facilities will have to be sized adequately to handle the proposed runoff volumes in this area.

Old Hwy 395 & SR-76:

The improvements proposed at this intersection include road widening of the west side of Old Hwy 395, north and south of SR-76, and the re-striping of this intersection to accommodate additional traffic lanes. There is plenty of flat area for the widening south of SR-76, however, the widening on the north side of SR-76 will require the construction of a large retaining wall with a brow ditch at the top of the wall to pick up the runoff from the large existing slope behind this wall.

Old Hwy 395 drains southerly to the intersection of SR-76 and gets picked up in two existing drain inlets on both side of Old Hwy 395. Runoff from SR-76 flows westerly to the intersection of Old Hwy 395 and also gets picked up in two existing drain inlets on both sides of SR-76. Runoff that falls in the intersection continues to flow southerly on Old Hwy 395 or westerly on SR-76. The improvements to these two legs of the intersection will not impact the existing drainage pattern or facilities.

The widening of the west side of Old Hwy 395 (north of SR-76) will cause the relocation of the existing drain inlet to the new AC berm line. The brow ditch behind the proposed retaining wall will be picked up in a catch basin and will connect to the back of the relocated drain inlet. Any increase in runoff due to the proposed improvements to this intersection should be minimal since the additional imperious area is minimal and the widening occurs in areas already more or less impervious (i.e. hard compacted dirt adjacent to the existing pavement). Any proposed drainage facilities and any undersized existing facilities will have to be sized adequately to handle the proposed runoff volumes in this area.

SR-76 & Pankey Rd (south):

The proposed improvements at this intersection include the road widening of Pankey Rd (south) & Pala Mesa Drive, south and north of the intersection with SR-76, respectively, the re-striping of this intersection and the installation of a traffic signal.

Runoff from both Pankey Rd (south) and Pala Mesa Dr (north) flow away from SR-76. Runoff from SR-76 flows westerly through this intersection. However the runoff in SR-76 exits the street prior to this intersection in AC spillways proposed with the SR-76 realignment/widening construction currently underway by Granite Construction.

Since improvements to this intersection have been designed per current Caltrans standards with the proposed realignment/widening of SR-76 and since runoff from these intersecting streets flows away from this intersection, the proposed improvements with this project should have minimal impact to the drainage in this area.

SR-76 & Horse Ranch Creek Rd:

Horse Ranch Creek Rd will be new road construction and any proposed drainage facilities will be designed and constructed per County/Caltrans standards. With this new road connection there is a right-turn lane proposed on SR-76 that would require the widening of the north side of SR-76, easterly of this intersection. This widening will require the relocation/extension of drainage facilities proposed with the SR-76 re-alignment/widening project currently under construction. Even with the relocation/extension of these drainage facilities there should be no impact to the drainage pattern or capacity of these improvements since the amount of additional impervious area, and the corresponding runoff, should be minimal.

Southbound & Northbound on-ramps at SR-76 & I-15:

The improvements at this location are primarily for new construction. However, the construction of the two new proposed on-ramps requires the construction of two culverts under the southbound ramp to allow existing runoff to cross the road and the construction of a drain inlet (and outlet pipe) on the northbound ramp to pick up runoff from the ramp before it connects to I-15.

See Section 7 of this report for detailed hydrologic and hydraulic analysis of these off-site intersections.

SECTION 3: METHOD OF ANALYSIS

A number of methods and computer programs were utilized in the analysis of the hydrologic impact of the project site.

The project site is located at the lower end of the Horse Ranch Creek watershed. The Horse Ranch Creek primarily bypasses the proposed development on the westerly end of the site. The Horse Ranch Creek watershed has approximately 7,443 acres of area, or 11.6 square miles. Since the watershed is way over one sq. mi., a NRCS hydrologic analysis was necessary. The entire watershed, under both the pre-development and post-development conditions, was analyzed with HECHMS souftware published by the Army Corp of Engineers. The lag times for the subareas with tributary areas greater than one square mile were determined using the Corps Lag Equation (4-17). The watershed lengths and slopes were determined using a topographical map obtained from the County Department of Public Works GIS Section. Centroid locations for the subareas were determined using the "MASSPROP" command for a region in AutoCAD. Basin "n" value of 0.05 was determined to be most representative of the rugged topography, ground cover, and channel characteristics of the watershed. HEC-HMS models were prepared to represent the existing and developed conditions in the watershed. The existing condition model consisted of two subareas and one routing reach. This configuration was selected to determine the hydrograph for the channel that passes through the project site. Since Subarea C has its confluence with the main channel near the Pankey Road North Bridge, it was assumed that runoff from this area was directly tributary to the bridge. The developed condition model was configured similarly to the existing condition model. Subarea AB was modified to AB-Rev to account for the proposed improvements at the southerly end of the subarea. Subarea C was changed to C-Rev to account for the separation of the Onsite area from the other areas within Subarea C. The Onsite-S subarea was comprised of the area that will be tributary to the proposed detention basin. As in the existing condition, Subarea C and the Onsite detention basin were assumed to be directly tributary to the Pankey Road North Bridge because of the close proximity of the confluences to the bridge. Models were simulated using a 5 minute time step to match the period of maximum precipitation intensity. Input data calculations and HEC-HMS output and data files are included with this submittal.

The curve number (Cn) values for the watershed is calculated based the latest land use map from the County of San Diego that was overlaid over an NRCS soils map. The watershed is comprised of Hydrologic Groups B, C, and D. The area of each group within each subarea was determined, and then land uses were assigned. A spreadsheet showing the calculations and the corresponding mapping are attached to this report in Section 9.

There are several types of development both present and proposed for the watershed: Industrial/commercial, low density residential, med density residential, high density residential, roadways and streets and natural areas. The individual land use areas are measured and tabulated based on the soil type, see Section 9 for detailed Cn value calculations. The areas of proposed high density residential, roadway and commercial developments are measure from the latest design of the proposed project.

A spreadsheet was developed to prepare a nested storm, per the criteria of the hydrology manual. Lag times ranged from 10 to 50 minutes, so a 5 minute period of maximum intensity was used for the hyetograph. Precipitation-area reduction factors were interpolated from Table 4-1 for the 11.54 square mile watershed. The hyetograph was entered into HEC-HMS as a precipitation time series.

The HECHMS analysis will provide the pre-development and post-development peak flow rates at critical points to facilitate the design of proposed drainage systems as well as the evaluation of existing system's adequacy to handle the post-development flows.

The proposed detention basin is ~~also~~ modeled and analyzed with Pondpack with tail water conditions (due to Horse Ranch Creek) simulated – see Section 10 of this report. These runoff rates were used for the HEC-RAS

hydraulic analysis of Horse Ranch Creek (See Section 9) and to compare the pre and post development runoff leaving the project.

The onsite project and its immediate upstream tributary areas (to the east) form a sub-basin less than 1 square mile, thus the AES Rational Method program was utilized to determine the peak discharge from the discharge points onto and away from the developed area of the site – See Section 4 for the existing upstream (easterly) hydrology calculations, Section 5 for the pre-development onsite hydrology calculations and Section 6 for the post-development onsite hydrology calculations. As was mentioned in the above Introduction, any development upstream from this project, such as TM 5354 and TM 5424 and Palomar College, would have to detain, treat and release the post-development 100-year storm waters such that the quantity, quality and discharge rate, time, location & concentration would substantially resemble the pre-development conditions. Due to the fact that these upstream projects must provide on-site mitigation for changes to this watershed's hydrologic characteristics, post-development runoff characteristics from these upstream areas were assumed to be the same as the pre-development.

Finally, a HEC-RAS program, published by the Army Corp of Engineers, is utilized to analyze the hydraulic characteristics of the Horse Ranch Creek using the peak flow rates calculated from the HECHMS program (from Section 8). The pre and post-development floodplain limits of Horse Ranch Creek is determined from the water surface elevations at various cross sections along the creek bed. The runoff rates established with the HECHMS software were used in the HEC-RAS program to establish the pre and post-development 100-year floodplain limit – See Section 9 for the pre and post-development hydraulic calculations for Horse Ranch Creek. As required per the San Diego County Drainage Design Manual, a capacity analysis was also conducted with the channel n values set at 0.15, the maximum roughness coefficient expected during the life time of the channel. The water surface elevation determined under the capacity analysis will be used to set the elevations of improvements such as roadways and pads. Also included in Section 9 is preliminary hydraulic calculations of the existing 8' x 5' box culvert under Pankey Road (north) and the existing bridges on Pankey Road (both northerly and southerly of SR 76), as well as the existing SR76 bridge.

SECTION 3
RATIONAL METHOD AND MODIFIED RATIONAL METHOD

3.1 THE RATIONAL METHOD

The Rational Method (RM) is a mathematical formula used to determine the maximum runoff rate from a given rainfall. It has particular application in urban storm drainage, where it is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and small drainage structures. The RM is recommended for analyzing the runoff response from drainage areas up to approximately 1 square mile in size. It should not be used in instances where there is a junction of independent drainage systems or for drainage areas greater than approximately 1 square mile in size. In these instances, the Modified Rational Method (MRM) should be used for junctions of independent drainage systems in watersheds up to approximately 1 square mile in size (see Section 3.4); or the NRCS Hydrologic Method should be used for watersheds greater than approximately 1 square mile in size (see Section 4).

The RM can be applied using any design storm frequency (e.g., 100-year, 50-year, 10-year, etc.). The local agency determines the design storm frequency that must be used based on the type of project and specific local requirements. A discussion of design storm frequency is provided in Section 2.3 of this manual. A procedure has been developed that converts the 6-hour and 24-hour precipitation isopluvial map data to an Intensity-Duration curve that can be used for the rainfall intensity in the RM formula as shown in Figure 3-1. The RM is applicable to a 6-hour storm duration because the procedure uses Intensity-Duration Design Charts that are based on a 6-hour storm duration.

3.1.1 Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to

flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed as follows:

$$Q = C\,I\,A$$

Where: Q = peak discharge, in cubic feet per second (cfs)
C = runoff coefficient, proportion of the rainfall that runs off the surface (no units)
I = average rainfall intensity for a duration equal to the T_c for the area, in inches per hour (Note: If the computed T_c is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)
A = drainage area contributing to the design location, in acres

Combining the units for the expression CIA yields:

$$\left(\frac{1\text{ acre}\times\text{inch}}{\text{hour}}\right)\left(\frac{43{,}560\text{ ft}^2}{\text{acre}}\right)\left(\frac{1\text{ foot}}{12\text{ inches}}\right)\left(\frac{1\text{ hour}}{3{,}600\text{ seconds}}\right) \Rightarrow 1.008\text{ cfs}$$

For practical purposes the unit conversion coefficient difference of 0.8% can be ignored.

The RM formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

Unlike the MRM (discussed in Section 3.4) or the NRCS hydrologic method (discussed in Section 4), the RM does not create hydrographs and therefore does not add separate subarea hydrographs at collection points. Instead, the RM develops peak discharges in the main line by increasing the T_c as flow travels downstream.

Characteristics of, or assumptions inherent to, the RM are listed below:

- The discharge flow rate resulting from any I is maximum when the I lasts as long as or longer than the T_c.

- The storm frequency of peak discharges is the same as that of I for the given T_c.

- The fraction of rainfall that becomes runoff (or the runoff coefficient, C) is independent of I or precipitation zone number (PZN) condition (PZN Condition is discussed in Section 4.1.2.4).

- The peak rate of runoff is the only information produced by using the RM.

3.1.2 Runoff Coefficient

Table 3-1 lists the estimated runoff coefficients for urban areas. The concepts related to the runoff coefficient were evaluated in a report entitled *Evaluation, Rational Method "C" Values* (Hill, 2002) that was reviewed by the Hydrology Manual Committee. The Report is available at San Diego County Department of Public Works, Flood Control Section and on the San Diego County Department of Public Works web page.

The runoff coefficients are based on land use and soil type. Soil type can be determined from the soil type map provided in Appendix A. An appropriate runoff coefficient (C) for each type of land use in the subarea should be selected from this table and multiplied by the percentage of the total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient (Σ[CA]). Good engineering judgment should be used when applying the values presented in Table 3-1, as adjustments to these values may be appropriate based on site-specific characteristics. In any event, the impervious percentage (% Impervious) as given in the table, for any area, shall govern the selected value for C. The runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following formula:

$$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$$

Where: C_p = Pervious Coefficient Runoff Value for the soil type (shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious). Soil type can be determined from the soil type map provided in Appendix A.

The values in Table 3-1 are typical for most urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the local agency.

SECTION 4:
EXISTING UNDISTURBED UPSTREAM (EASTERLY) BASINS - 100-YEAR RATIONAL HYDROLOGY CALCS

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2004 Advanced Engineering Software (aes)
            Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                              Analysis prepared by:

                                LANDMARK CONSULTING
                            9555 GENESEE AVENUE, SUITE 200
                                 SAN DEIGO, CA 92121
                                  TEL:  858-587-8070

 ************************** DESCRIPTION OF STUDY **************************
* CAMPUS PARK                                                             *
* VALLEY CENTER, CA. UPSTREAM HYDROLOGY ANALYSIS (EASTERLY OF SITE)       *
* 100-YEAR STORM                                                          *
 *************************************************************************

  FILE NAME: 614USC.DAT
  TIME/DATE OF STUDY: 09:33 02/09/2009
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE   1001.00 TO NODE   1001.10 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    950.00
 DOWNSTREAM ELEVATION(FEET) =    927.50
 ELEVATION DIFFERENCE(FEET) =     22.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE   1001.10 TO NODE   1002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    927.50  DOWNSTREAM(FEET) =    770.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.2250
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.312
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.90
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.12
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   5.49
 Tc(MIN.) =  11.76
 SUBAREA AREA(ACRES) =     1.40       SUBAREA RUNOFF(CFS) =    2.60
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      1.60         PEAK FLOW RATE(CFS) =       2.97

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.50
 LONGEST FLOWPATH FROM NODE   1001.00 TO NODE   1002.00 =   800.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2001.00 TO NODE   2001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1150.00
 DOWNSTREAM ELEVATION(FEET) =   1116.70
 ELEVATION DIFFERENCE(FEET) =     33.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE   2001.10 TO NODE   2002.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1116.70  DOWNSTREAM(FEET) =   1050.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.3335
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.706
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.91
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.73
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   1.93
 Tc(MIN.) =   8.19
 SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.70
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      0.50         PEAK FLOW RATE(CFS) =       1.17

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   2.06
 LONGEST FLOWPATH FROM NODE   2001.00 TO NODE   2002.00 =   300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2002.00 TO NODE   2003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1050.00  DOWNSTREAM(FEET) =    602.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1350.00   CHANNEL SLOPE =  0.3319
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.057
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.03
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.01
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   4.49
 Tc(MIN.) =  12.69
 SUBAREA AREA(ACRES) =    15.30       SUBAREA RUNOFF(CFS) =   27.08
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     15.80         PEAK FLOW RATE(CFS) =      27.97

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   6.34
 LONGEST FLOWPATH FROM NODE   2001.00 TO NODE   2003.00 =  1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   3001.00 TO NODE   3001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1525.00
 DOWNSTREAM ELEVATION(FEET) =   1475.00
 ELEVATION DIFFERENCE(FEET) =     50.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      0.84
 TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.84

****************************************************************************
 FLOW PROCESS FROM NODE   3001.10 TO NODE   3002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1475.00  DOWNSTREAM(FEET) =   1300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.5000
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.487
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.07
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.47
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   2.36
 Tc(MIN.) =   8.63
 SUBAREA AREA(ACRES) =     1.10       SUBAREA RUNOFF(CFS) =    2.50
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      1.40         PEAK FLOW RATE(CFS) =       3.18

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.96
 LONGEST FLOWPATH FROM NODE   3001.00 TO NODE   3002.00 =   450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   3002.00 TO NODE   3003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1300.00  DOWNSTREAM(FEET) =    875.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00   CHANNEL SLOPE =  0.3864
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.161
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.05
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.00
 AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   3.67
 Tc(MIN.) =  12.29
 SUBAREA AREA(ACRES) =    15.10       SUBAREA RUNOFF(CFS) =   27.28
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     16.50         PEAK FLOW RATE(CFS) =      29.81
```

```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   6.32
 LONGEST FLOWPATH FROM NODE   3001.00 TO NODE   3003.00 =  1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   3003.00 TO NODE   3003.00 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.) =  12.29
 RAINFALL INTENSITY(INCH/HR) =   5.16
 TOTAL STREAM AREA(ACRES) =    16.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.81

****************************************************************************
 FLOW PROCESS FROM NODE   3004.00 TO NODE   3004.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1420.00
 DOWNSTREAM ELEVATION(FEET) =   1368.00
 ELEVATION DIFFERENCE(FEET) =     52.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.40
 TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
 FLOW PROCESS FROM NODE   3004.10 TO NODE   3005.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1368.00  DOWNSTREAM(FEET) =   1200.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   320.00   CHANNEL SLOPE =  0.5250
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.890
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.36
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.59
 Tc(MIN.) =   7.86
 SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    3.86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      2.10         PEAK FLOW RATE(CFS) =       5.06
```

```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   4.23
 LONGEST FLOWPATH FROM NODE   3004.00 TO NODE   3005.00 =   420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   3005.00 TO NODE   3003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1200.00  DOWNSTREAM(FEET) =    875.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   850.00   CHANNEL SLOPE =  0.3824
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.898
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     23.63
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.62
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   2.14
 Tc(MIN.) =  10.00
 SUBAREA AREA(ACRES) =    17.90       SUBAREA RUNOFF(CFS) =   36.95
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     20.00         PEAK FLOW RATE(CFS) =      41.29

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   7.98
 LONGEST FLOWPATH FROM NODE   3004.00 TO NODE   3003.00 =  1270.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   3003.00 TO NODE   3003.00 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.) =  10.00
 RAINFALL INTENSITY(INCH/HR) =   5.90
 TOTAL STREAM AREA(ACRES) =    20.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     41.29

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       29.81    12.29        5.161         16.50
    2       41.29    10.00        5.898         20.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       65.52    10.00        5.898
    2       65.94    12.29        5.161
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     65.94   Tc(MIN.) =   12.29
 TOTAL AREA(ACRES) =     36.50
 LONGEST FLOWPATH FROM NODE   3001.00 TO NODE   3003.00 =  1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   3003.00 TO NODE   3006.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    875.00  DOWNSTREAM(FEET) =    820.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   320.00   CHANNEL SLOPE =  0.1719
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   4.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.988
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     72.05
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.99
 AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   0.67
 Tc(MIN.) =  12.96
 SUBAREA AREA(ACRES) =     7.00       SUBAREA RUNOFF(CFS) =   12.22
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     43.50         PEAK FLOW RATE(CFS) =      75.95

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   8.13
 LONGEST FLOWPATH FROM NODE   3001.00 TO NODE   3006.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   3006.00 TO NODE   3007.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    820.00  DOWNSTREAM(FEET) =    666.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   905.00   CHANNEL SLOPE =  0.1702
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   4.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.602
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     83.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.74
 AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.73
 Tc(MIN.) =  14.69
 SUBAREA AREA(ACRES) =     8.90       SUBAREA RUNOFF(CFS) =   14.33
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     52.40         PEAK FLOW RATE(CFS) =      84.40

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   8.76
 LONGEST FLOWPATH FROM NODE   3001.00 TO NODE   3007.00 =  2775.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   4001.00 TO NODE   4001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1090.00
 DOWNSTREAM ELEVATION(FEET) =   1048.00
 ELEVATION DIFFERENCE(FEET) =     42.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE   4001.10 TO NODE   4002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1048.00  DOWNSTREAM(FEET) =    900.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.4229
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.430
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.35
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   2.48
 Tc(MIN.) =   8.75
 SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    1.58
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      0.90         PEAK FLOW RATE(CFS) =       2.03

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.77
 LONGEST FLOWPATH FROM NODE   4001.00 TO NODE   4002.00 =   450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   4002.00 TO NODE   4003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    900.00  DOWNSTREAM(FEET) =    620.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.2667
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.343
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.02
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   2.91
  Tc(MIN.) =  11.65
  SUBAREA AREA(ACRES) =     9.80       SUBAREA RUNOFF(CFS) =   18.33
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     10.70         PEAK FLOW RATE(CFS) =      20.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   7.42
  LONGEST FLOWPATH FROM NODE   4001.00 TO NODE   4003.00 =  1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   5001.00 TO NODE   5001.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1325.00
  DOWNSTREAM ELEVATION(FEET) =   1267.00
  ELEVATION DIFFERENCE(FEET) =     58.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      1.12
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE   5001.10 TO NODE   5002.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1267.00  DOWNSTREAM(FEET) =   1050.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   370.00   CHANNEL SLOPE =  0.5865
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.618
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.99
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   2.10
  Tc(MIN.) =   8.36
  SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    3.71
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      2.00         PEAK FLOW RATE(CFS) =       4.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   3.54
  LONGEST FLOWPATH FROM NODE   5001.00 TO NODE   5002.00 =   470.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   5002.00 TO NODE   5003.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1050.00  DOWNSTREAM(FEET) =    800.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.3333
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.432
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.17
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   3.00
  Tc(MIN.) =  11.36
  SUBAREA AREA(ACRES) =     7.90       SUBAREA RUNOFF(CFS) =   15.02
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      9.90         PEAK FLOW RATE(CFS) =      18.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   5.02
  LONGEST FLOWPATH FROM NODE   5001.00 TO NODE   5003.00 =  1220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   5003.00 TO NODE   5003.00 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.) =  11.36
  RAINFALL INTENSITY(INCH/HR) =   5.43
  TOTAL STREAM AREA(ACRES) =     9.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.82

****************************************************************************
  FLOW PROCESS FROM NODE   5004.00 TO NODE   5004.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1175.00
  DOWNSTREAM ELEVATION(FEET) =   1122.00
  ELEVATION DIFFERENCE(FEET) =     53.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      0.84
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.84
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   5004.10 TO NODE   5005.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1122.00  DOWNSTREAM(FEET) =   1000.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.5304
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.750
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.08
 AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =   1.84
 Tc(MIN.) =   8.11
 SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    1.65
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      1.00         PEAK FLOW RATE(CFS) =       2.36

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   2.28
 LONGEST FLOWPATH FROM NODE   5004.00 TO NODE   5005.00 =   330.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   5005.00 TO NODE   5003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1000.00  DOWNSTREAM(FEET) =    800.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00   CHANNEL SLOPE =  0.3509
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.865
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     16.40
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.81
 AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   1.98
 Tc(MIN.) =  10.09
 SUBAREA AREA(ACRES) =    13.60       SUBAREA RUNOFF(CFS) =   27.92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     14.60         PEAK FLOW RATE(CFS) =      29.97

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   6.11
 LONGEST FLOWPATH FROM NODE   5004.00 TO NODE   5003.00 =   900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   5003.00 TO NODE   5003.00 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.) =  10.09
  RAINFALL INTENSITY(INCH/HR) =   5.86
  TOTAL STREAM AREA(ACRES) =    14.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.82    11.36        5.432         9.90
      2       29.97    10.09        5.865        14.60

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       46.68    10.09       5.865
      2       46.58    11.36       5.432

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     46.68   Tc(MIN.) =   10.09
  TOTAL AREA(ACRES) =     24.50
  LONGEST FLOWPATH FROM NODE   5001.00 TO NODE   5003.00 =  1220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   5003.00 TO NODE   5006.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    800.00  DOWNSTREAM(FEET) =    650.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1070.00   CHANNEL SLOPE =  0.1402
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.115
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     65.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.49
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   2.38
  Tc(MIN.) =  12.47
  SUBAREA AREA(ACRES) =    21.20       SUBAREA RUNOFF(CFS) =   37.95
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     45.70         PEAK FLOW RATE(CFS) =      81.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   8.11
  LONGEST FLOWPATH FROM NODE   5001.00 TO NODE   5006.00 =  2290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   5006.00 TO NODE   5007.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =    650.00  DOWNSTREAM(FEET) =    590.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   478.00   CHANNEL SLOPE =  0.1255
CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.867
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  78
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     83.35
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.96
AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   1.00
Tc(MIN.) =  13.47
SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    3.07
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =     47.50         PEAK FLOW RATE(CFS) =      81.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   7.91
LONGEST FLOWPATH FROM NODE   5001.00 TO NODE   5007.00 =  2768.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   6001.00 TO NODE   6001.10 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  78
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =   1030.00
DOWNSTREAM ELEVATION(FEET) =    981.00
ELEVATION DIFFERENCE(FEET) =     49.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
SUBAREA RUNOFF(CFS) =      0.56
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
FLOW PROCESS FROM NODE   6001.10 TO NODE   6002.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    981.00  DOWNSTREAM(FEET) =    885.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.4800
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.113
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  78
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.75
```

```
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.21
 Tc(MIN.) =   7.48
 SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    1.24
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      0.70         PEAK FLOW RATE(CFS) =       1.74

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   3.39
 LONGEST FLOWPATH FROM NODE   6001.00 TO NODE   6002.00 =   300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   6002.00 TO NODE   6003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    885.00  DOWNSTREAM(FEET) =    614.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1280.00   CHANNEL SLOPE =  0.2117
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.183
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.50
 AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   4.74
 Tc(MIN.) =  12.22
 SUBAREA AREA(ACRES) =     6.50       SUBAREA RUNOFF(CFS) =   11.79
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      7.20         PEAK FLOW RATE(CFS) =      13.06

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   5.34
 LONGEST FLOWPATH FROM NODE   6001.00 TO NODE   6003.00 =  1580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   6003.00 TO NODE   6003.00 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.) =  12.22
 RAINFALL INTENSITY(INCH/HR) =   5.18
 TOTAL STREAM AREA(ACRES) =     7.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.06

****************************************************************************
 FLOW PROCESS FROM NODE   6004.00 TO NODE   6004.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
 UPSTREAM ELEVATION(FEET) =    935.00
 DOWNSTREAM ELEVATION(FEET) =    894.00
 ELEVATION DIFFERENCE(FEET) =     41.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE   6004.10 TO NODE   6005.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    894.00  DOWNSTREAM(FEET) =    825.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   170.00   CHANNEL SLOPE =  0.4059
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.996
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.05
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.02
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   1.41
 Tc(MIN.) =   7.67
 SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      0.60         PEAK FLOW RATE(CFS) =       1.47

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   2.16
 LONGEST FLOWPATH FROM NODE   6004.00 TO NODE   6005.00 =   270.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   6005.00 TO NODE   6003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    825.00  DOWNSTREAM(FEET) =    614.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   770.00   CHANNEL SLOPE =  0.2740
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.698
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.78
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.46
 AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   2.88
 Tc(MIN.) =  10.55
 SUBAREA AREA(ACRES) =     9.20       SUBAREA RUNOFF(CFS) =   18.35
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      9.80         PEAK FLOW RATE(CFS) =      19.54
```

```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   5.69
 LONGEST FLOWPATH FROM NODE   6004.00 TO NODE   6003.00 =  1040.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   6003.00 TO NODE   6003.00 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.) =  10.55
 RAINFALL INTENSITY(INCH/HR) =   5.70
 TOTAL STREAM AREA(ACRES) =     9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.54

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       13.06    12.22        5.183          7.20
    2       19.54    10.55        5.698          9.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       30.82    10.55        5.698
    2       30.84    12.22        5.183

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     30.84   Tc(MIN.) =   12.22
 TOTAL AREA(ACRES) =     17.00
 LONGEST FLOWPATH FROM NODE   6001.00 TO NODE   6003.00 =  1580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   6003.00 TO NODE   6006.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    614.00  DOWNSTREAM(FEET) =    590.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.1600
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.047
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     31.72
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.86
 AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   0.51
 Tc(MIN.) =  12.73
 SUBAREA AREA(ACRES) =     1.00       SUBAREA RUNOFF(CFS) =    1.77
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
```

```
 TOTAL AREA(ACRES) =     18.00          PEAK FLOW RATE(CFS) =      31.79

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   4.87
 LONGEST FLOWPATH FROM NODE   6001.00 TO NODE   6006.00 =  1730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7001.00 TO NODE   7001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    889.10
 DOWNSTREAM ELEVATION(FEET) =    837.30
 ELEVATION DIFFERENCE(FEET) =     51.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      0.84
 TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.84

****************************************************************************
 FLOW PROCESS FROM NODE   7001.10 TO NODE   7002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    837.30  DOWNSTREAM(FEET) =    630.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.5182
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.443
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.99
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.72
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   2.45
 Tc(MIN.) =   8.72
 SUBAREA AREA(ACRES) =     1.00       SUBAREA RUNOFF(CFS) =    2.26
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      1.30         PEAK FLOW RATE(CFS) =       2.93

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   3.28
 LONGEST FLOWPATH FROM NODE   7001.00 TO NODE   7002.00 =   500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   8001.00 TO NODE   8001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    847.30
  DOWNSTREAM ELEVATION(FEET) =    809.00
  ELEVATION DIFFERENCE(FEET) =     38.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      3.63
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =      3.63

****************************************************************************
  FLOW PROCESS FROM NODE   8001.10 TO NODE   8002.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    809.00  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   850.00   CHANNEL SLOPE =  0.3800
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.661
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.04
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =   8.28
  SUBAREA AREA(ACRES) =    11.40       SUBAREA RUNOFF(CFS) =   26.58
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     12.70         PEAK FLOW RATE(CFS) =      29.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   8.57
  LONGEST FLOWPATH FROM NODE   8001.00 TO NODE   8002.00 =   950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   9001.00 TO NODE   9001.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    680.00
  DOWNSTREAM ELEVATION(FEET) =    644.60
  ELEVATION DIFFERENCE(FEET) =     35.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      1.12
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE   9001.10 TO NODE   9002.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    644.60  DOWNSTREAM(FEET) =    450.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   550.00   CHANNEL SLOPE =  0.3538
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.627
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.04
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   4.49
  Tc(MIN.) =  10.75
  SUBAREA AREA(ACRES) =     0.60       SUBAREA RUNOFF(CFS) =    1.18
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      1.00         PEAK FLOW RATE(CFS) =       1.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   2.33
  LONGEST FLOWPATH FROM NODE   9001.00 TO NODE   9002.00 =   650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  10001.00 TO NODE  10001.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    725.00
  DOWNSTREAM ELEVATION(FEET) =    693.70
  ELEVATION DIFFERENCE(FEET) =     31.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      2.79
  TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =      2.79

****************************************************************************
  FLOW PROCESS FROM NODE  10001.10 TO NODE  10002.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    693.70  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.3123
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.909
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.32
```

```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    3.21
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =    1.56
 Tc(MIN.) =   7.82
 SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =     7.01
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      3.90         PEAK FLOW RATE(CFS) =       9.43

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   3.76
 LONGEST FLOWPATH FROM NODE  10001.00 TO NODE  10002.00 =   400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  10002.00 TO NODE  10003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    600.00  DOWNSTREAM(FEET) =    465.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1450.00   CHANNEL SLOPE =  0.0931
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.194
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     53.24
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.55
 AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   4.35
 Tc(MIN.) =  12.17
 SUBAREA AREA(ACRES) =    47.40       SUBAREA RUNOFF(CFS) =   86.17
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     51.30         PEAK FLOW RATE(CFS) =      93.26

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   6.70
 LONGEST FLOWPATH FROM NODE  10001.00 TO NODE  10003.00 =  1850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  10003.00 TO NODE  10003.00 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.) =  12.17
 RAINFALL INTENSITY(INCH/HR) =   5.19
 TOTAL STREAM AREA(ACRES) =    51.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     93.26

****************************************************************************
 FLOW PROCESS FROM NODE  10004.00 TO NODE  10004.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    775.00
 DOWNSTREAM ELEVATION(FEET) =    743.00
 ELEVATION DIFFERENCE(FEET) =     32.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      2.51
 TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      2.51

****************************************************************************
 FLOW PROCESS FROM NODE  10004.10 TO NODE  10005.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    743.00  DOWNSTREAM(FEET) =    625.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   370.00   CHANNEL SLOPE =  0.3189
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.733
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.44
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.29
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.87
 Tc(MIN.) =   8.14
 SUBAREA AREA(ACRES) =     3.30       SUBAREA RUNOFF(CFS) =    7.78
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      4.20         PEAK FLOW RATE(CFS) =       9.90

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   3.96
 LONGEST FLOWPATH FROM NODE  10004.00 TO NODE  10005.00 =   470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  10005.00 TO NODE  10003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    625.00  DOWNSTREAM(FEET) =    465.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.1524
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.090
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.41
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.96
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   4.42
 Tc(MIN.) =  12.56
 SUBAREA AREA(ACRES) =    10.50       SUBAREA RUNOFF(CFS) =   18.70
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     14.70         PEAK FLOW RATE(CFS) =      26.19
```

```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   4.57
 LONGEST FLOWPATH FROM NODE  10004.00 TO NODE  10003.00 =  1520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  10003.00 TO NODE  10003.00 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.) =  12.56
 RAINFALL INTENSITY(INCH/HR) =   5.09
 TOTAL STREAM AREA(ACRES) =    14.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.19

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        93.26    12.17        5.194         51.30
     2        26.19    12.56        5.090         14.70

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1       118.64    12.17       5.194
     2       117.57    12.56       5.090

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    118.64   Tc(MIN.) =   12.17
 TOTAL AREA(ACRES) =     66.00
 LONGEST FLOWPATH FROM NODE  10001.00 TO NODE  10003.00 =  1850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  10003.00 TO NODE  10006.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    436.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00   CHANNEL SLOPE =  0.0483
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.821
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    126.23
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.71
 AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   1.49
 Tc(MIN.) =  13.67
 SUBAREA AREA(ACRES) =     9.00       SUBAREA RUNOFF(CFS) =   15.19
```

```
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     75.00          PEAK FLOW RATE(CFS) =     126.55

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   6.72
 LONGEST FLOWPATH FROM NODE  10001.00 TO NODE  10006.00 =  2450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  11001.00 TO NODE  11001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    890.00
 DOWNSTREAM ELEVATION(FEET) =    836.00
 ELEVATION DIFFERENCE(FEET) =     54.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.40
 TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
 FLOW PROCESS FROM NODE  11001.10 TO NODE  11002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    836.00  DOWNSTREAM(FEET) =    675.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.5367
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.951
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.36
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.37
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.48
 Tc(MIN.) =   7.75
 SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    3.89
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      2.10         PEAK FLOW RATE(CFS) =       5.11

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   4.27
 LONGEST FLOWPATH FROM NODE  11001.00 TO NODE  11002.00 =   400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  11002.00 TO NODE  11003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    430.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1600.00   CHANNEL SLOPE =  0.1531
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.867
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     20.66
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.66
 AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   5.72
 Tc(MIN.) =  13.47
 SUBAREA AREA(ACRES) =    17.80       SUBAREA RUNOFF(CFS) =   30.32
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     19.90          PEAK FLOW RATE(CFS) =      33.90

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   5.53
 LONGEST FLOWPATH FROM NODE  11001.00 TO NODE  11003.00 =  2000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  12001.00 TO NODE  12001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    730.00
 DOWNSTREAM ELEVATION(FEET) =    691.00
 ELEVATION DIFFERENCE(FEET) =     39.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.40
 TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
 FLOW PROCESS FROM NODE  12001.10 TO NODE  12002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    691.00  DOWNSTREAM(FEET) =    575.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.3867
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.941
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.45
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.33
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.50
 Tc(MIN.) =   7.77
 SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    4.13
```

```
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      2.20          PEAK FLOW RATE(CFS) =       5.34

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.93
 LONGEST FLOWPATH FROM NODE  12001.00 TO NODE  12002.00 =   400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  12002.00 TO NODE  12003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    575.00  DOWNSTREAM(FEET) =    420.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1400.00   CHANNEL SLOPE =  0.1107
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.084
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     26.44
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.84
 AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   4.82
 Tc(MIN.) =  12.58
 SUBAREA AREA(ACRES) =    23.30       SUBAREA RUNOFF(CFS) =   41.46
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     25.50          PEAK FLOW RATE(CFS) =      45.38

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   5.86
 LONGEST FLOWPATH FROM NODE  12001.00 TO NODE  12003.00 =  1800.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13001.00 TO NODE  13001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    760.00
 DOWNSTREAM ELEVATION(FEET) =    732.00
 ELEVATION DIFFERENCE(FEET) =     28.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      2.23
 TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      2.23

****************************************************************************
 FLOW PROCESS FROM NODE  13001.10 TO NODE  13002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    732.00  DOWNSTREAM(FEET) =    525.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.2760
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.213
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.76
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.23
 AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   2.96
 Tc(MIN.) =   9.22
 SUBAREA AREA(ACRES) =     5.90       SUBAREA RUNOFF(CFS) =   12.83
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      6.70         PEAK FLOW RATE(CFS) =      14.57

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   5.09
 LONGEST FLOWPATH FROM NODE  13001.00 TO NODE  13002.00 =   850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13002.00 TO NODE  13003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    465.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.1333
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.576
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     18.48
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.46
 AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   1.68
 Tc(MIN.) =  10.91
 SUBAREA AREA(ACRES) =     4.00       SUBAREA RUNOFF(CFS) =    7.81
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     10.70         PEAK FLOW RATE(CFS) =      20.88

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   4.80
 LONGEST FLOWPATH FROM NODE  13001.00 TO NODE  13003.00 =  1300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13003.00 TO NODE  13003.00 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.) =  10.91
 RAINFALL INTENSITY(INCH/HR) =   5.58
 TOTAL STREAM AREA(ACRES) =    10.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.88
```

```
****************************************************************************
 FLOW PROCESS FROM NODE  13004.00 TO NODE  13004.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    720.43
 DOWNSTREAM ELEVATION(FEET) =    686.70
 ELEVATION DIFFERENCE(FEET) =     33.73
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      2.23
 TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      2.23

****************************************************************************
 FLOW PROCESS FROM NODE  13004.10 TO NODE  13005.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    686.70  DOWNSTREAM(FEET) =    575.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   330.00   CHANNEL SLOPE =  0.3385
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.767
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.22
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.03
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.81
 Tc(MIN.) =   8.08
 SUBAREA AREA(ACRES) =     2.50       SUBAREA RUNOFF(CFS) =    5.92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      3.30         PEAK FLOW RATE(CFS) =       7.82

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.56
 LONGEST FLOWPATH FROM NODE  13004.00 TO NODE  13005.00 =   430.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13005.00 TO NODE  13003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    575.00  DOWNSTREAM(FEET) =    465.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   770.00   CHANNEL SLOPE =  0.1429
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.416
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
```

```
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.33
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.85
 AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   3.33
 Tc(MIN.) =  11.41
 SUBAREA AREA(ACRES) =     3.70       SUBAREA RUNOFF(CFS) =    7.01
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      7.00         PEAK FLOW RATE(CFS) =      13.27

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   4.06
 LONGEST FLOWPATH FROM NODE  13004.00 TO NODE  13003.00 =  1200.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13003.00 TO NODE  13003.00 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.) =  11.41
 RAINFALL INTENSITY(INCH/HR) =   5.42
 TOTAL STREAM AREA(ACRES) =     7.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.27

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       20.88    10.91        5.576         10.70
    2       13.27    11.41        5.416          7.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       33.56    10.91        5.576
    2       33.55    11.41        5.416

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     33.56   Tc(MIN.) =   10.91
 TOTAL AREA(ACRES) =     17.70
 LONGEST FLOWPATH FROM NODE  13001.00 TO NODE  13003.00 =  1300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13003.00 TO NODE  13006.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    435.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   320.00   CHANNEL SLOPE =  0.0938
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.287
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     43.47
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.68
 AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.94
 Tc(MIN.) =  11.85
 SUBAREA AREA(ACRES) =    10.70       SUBAREA RUNOFF(CFS) =   19.80
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     28.40         PEAK FLOW RATE(CFS) =      52.55

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   6.08
 LONGEST FLOWPATH FROM NODE  13001.00 TO NODE  13006.00 =  1620.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13006.00 TO NODE  13006.00 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.) =  11.85
 RAINFALL INTENSITY(INCH/HR) =   5.29
 TOTAL STREAM AREA(ACRES) =    28.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     52.55

****************************************************************************
 FLOW PROCESS FROM NODE  13007.00 TO NODE  13007.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    800.00
 DOWNSTREAM ELEVATION(FEET) =    755.00
 ELEVATION DIFFERENCE(FEET) =     45.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.12
 TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.12

****************************************************************************
 FLOW PROCESS FROM NODE  13007.10 TO NODE  13008.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    755.00  DOWNSTREAM(FEET) =    575.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.4500
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.332
```

```
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.76
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.48
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   2.69
 Tc(MIN.) =   8.96
 SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    3.32
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      1.90         PEAK FLOW RATE(CFS) =       4.21

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.95
 LONGEST FLOWPATH FROM NODE  13007.00 TO NODE  13008.00 =   500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13008.00 TO NODE  13006.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    575.00  DOWNSTREAM(FEET) =    435.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00   CHANNEL SLOPE =  0.1474
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.953
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.23
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.82
 AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   4.15
 Tc(MIN.) =  13.11
 SUBAREA AREA(ACRES) =     8.00       SUBAREA RUNOFF(CFS) =   13.87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      9.90         PEAK FLOW RATE(CFS) =      17.16

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   4.41
 LONGEST FLOWPATH FROM NODE  13007.00 TO NODE  13006.00 =  1450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  13006.00 TO NODE  13006.00 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.) =  13.11
 RAINFALL INTENSITY(INCH/HR) =   4.95
 TOTAL STREAM AREA(ACRES) =     9.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.16

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
```

```
    1       52.55    11.85        5.287         28.40
    2       17.16    13.11        4.953          9.90

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       68.06    11.85       5.287
      2       66.39    13.11       4.953

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     68.06   Tc(MIN.) =   11.85
  TOTAL AREA(ACRES) =     38.30
  LONGEST FLOWPATH FROM NODE  13001.00 TO NODE  13006.00 =  1620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  13006.00 TO NODE  13009.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    435.00  DOWNSTREAM(FEET) =    325.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1600.00   CHANNEL SLOPE =  0.0688
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.417
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     97.44
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.00
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   3.81
  Tc(MIN.) =  15.65
  SUBAREA AREA(ACRES) =    37.90       SUBAREA RUNOFF(CFS) =   58.59
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     76.20         PEAK FLOW RATE(CFS) =     117.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.73   FLOW VELOCITY(FEET/SEC.) =   7.52
  LONGEST FLOWPATH FROM NODE  13001.00 TO NODE  13009.00 =  3220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  13009.00 TO NODE  13010.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    325.00  DOWNSTREAM(FEET) =    310.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.0429
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.257
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
```

```
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    120.03
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.33
 AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   0.92
 Tc(MIN.) =  16.58
 SUBAREA AREA(ACRES) =     3.00       SUBAREA RUNOFF(CFS) =    4.47
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     79.20         PEAK FLOW RATE(CFS) =     118.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =   6.28
 LONGEST FLOWPATH FROM NODE  13001.00 TO NODE  13010.00 =  3570.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  14001.00 TO NODE  14001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    510.00
 DOWNSTREAM ELEVATION(FEET) =    483.00
 ELEVATION DIFFERENCE(FEET) =     27.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.12
 TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.12

****************************************************************************
 FLOW PROCESS FROM NODE  14001.10 TO NODE  14002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    325.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00   CHANNEL SLOPE =  0.2633
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.824
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.55
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   3.93
 Tc(MIN.) =  10.19
 SUBAREA AREA(ACRES) =     2.70       SUBAREA RUNOFF(CFS) =    5.50
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      3.10         PEAK FLOW RATE(CFS) =       6.32

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.12
 LONGEST FLOWPATH FROM NODE  14001.00 TO NODE  14002.00 =   700.00 FEET.

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

```
 FLOW PROCESS FROM NODE  14002.00 TO NODE  14003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    325.00  DOWNSTREAM(FEET) =    280.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0643
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   6.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.875
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.27
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.60
 AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   3.24
 Tc(MIN.) =  13.43
 SUBAREA AREA(ACRES) =    15.10       SUBAREA RUNOFF(CFS) =   25.76
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     18.20        PEAK FLOW RATE(CFS) =      31.05

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   4.27
 LONGEST FLOWPATH FROM NODE  14001.00 TO NODE  14003.00 =  1400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  15001.00 TO NODE  15001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    450.00
 DOWNSTREAM ELEVATION(FEET) =    436.50
 ELEVATION DIFFERENCE(FEET) =     13.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.12
 TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.12

****************************************************************************
 FLOW PROCESS FROM NODE  15001.10 TO NODE  15002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    302.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00   CHANNEL SLOPE =  0.1345
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.840
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
```

```
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.03
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.28
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   7.32
 Tc(MIN.) =  13.58
 SUBAREA AREA(ACRES) =     4.40       SUBAREA RUNOFF(CFS) =    7.45
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      4.80         PEAK FLOW RATE(CFS) =       8.13

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.77
 LONGEST FLOWPATH FROM NODE  15001.00 TO NODE  15002.00 =  1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  16001.00 TO NODE  16001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    415.00
 DOWNSTREAM ELEVATION(FEET) =    403.00
 ELEVATION DIFFERENCE(FEET) =     12.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.12
 TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.12

****************************************************************************
 FLOW PROCESS FROM NODE  16001.10 TO NODE  16002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    403.00  DOWNSTREAM(FEET) =    304.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   850.00   CHANNEL SLOPE =  0.1165
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.277
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.71
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.52
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   5.61
 Tc(MIN.) =  11.88
 SUBAREA AREA(ACRES) =     3.80       SUBAREA RUNOFF(CFS) =    7.02
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      4.20         PEAK FLOW RATE(CFS) =       7.76

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   3.04
 LONGEST FLOWPATH FROM NODE  16001.00 TO NODE  16002.00 =   950.00 FEET.

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

```
 FLOW PROCESS FROM NODE  17001.00 TO NODE  17001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    337.00
 DOWNSTREAM ELEVATION(FEET) =    333.20
 ELEVATION DIFFERENCE(FEET) =      3.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.184
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.300
 SUBAREA RUNOFF(CFS) =      0.51
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
 FLOW PROCESS FROM NODE  17001.10 TO NODE  17002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    333.20  DOWNSTREAM(FEET) =    304.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0471
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.571
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.01
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.35
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   7.66
 Tc(MIN.) =  14.84
 SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    2.88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      2.00         PEAK FLOW RATE(CFS) =       3.20

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.60
 LONGEST FLOWPATH FROM NODE  17001.00 TO NODE  17002.00 =   700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  18001.00 TO NODE  18001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    810.00
 DOWNSTREAM ELEVATION(FEET) =    778.00
 ELEVATION DIFFERENCE(FEET) =     32.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
```

```
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE  18001.10 TO NODE  18002.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    778.00  DOWNSTREAM(FEET) =    650.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.3200
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.577
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.06
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   2.18
  Tc(MIN.) =   8.44
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    4.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      2.30         PEAK FLOW RATE(CFS) =       5.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.64
  LONGEST FLOWPATH FROM NODE  18001.00 TO NODE  18002.00 =   500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  18002.00 TO NODE  18003.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    650.00  DOWNSTREAM(FEET) =    400.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1550.00   CHANNEL SLOPE =  0.1613
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.908
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     24.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.33
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   4.85
  Tc(MIN.) =  13.29
  SUBAREA AREA(ACRES) =    22.10       SUBAREA RUNOFF(CFS) =   37.97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     24.40         PEAK FLOW RATE(CFS) =      41.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.30   FLOW VELOCITY(FEET/SEC.) =   6.45
  LONGEST FLOWPATH FROM NODE  18001.00 TO NODE  18003.00 =  2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  18003.00 TO NODE  18003.00 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.) =  13.29
  RAINFALL INTENSITY(INCH/HR) =   4.91
  TOTAL STREAM AREA(ACRES) =    24.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     41.92

****************************************************************************
  FLOW PROCESS FROM NODE  18004.00 TO NODE  18004.10 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    686.00
  DOWNSTREAM ELEVATION(FEET) =    667.90
  ELEVATION DIFFERENCE(FEET) =     18.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.60   TOTAL RUNOFF(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE  18004.10 TO NODE  18005.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    667.90  DOWNSTREAM(FEET) =    550.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00   CHANNEL SLOPE =  0.1814
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.784
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.68
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   4.04
  Tc(MIN.) =  10.31
  SUBAREA AREA(ACRES) =     4.10       SUBAREA RUNOFF(CFS) =    8.30
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      4.70         PEAK FLOW RATE(CFS) =       9.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   3.24
  LONGEST FLOWPATH FROM NODE  18004.00 TO NODE  18005.00 =   750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  18005.00 TO NODE  18003.00 IS CODE =  51
------------------------------------------------------------------------------
```

```
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    550.00  DOWNSTREAM(FEET) =    400.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   670.00   CHANNEL SLOPE =  0.2239
CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   6.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.078
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  78
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.76
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.84
AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   2.31
Tc(MIN.) =  12.61
SUBAREA AREA(ACRES) =     7.00       SUBAREA RUNOFF(CFS) =   12.44
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =     11.70         PEAK FLOW RATE(CFS) =      20.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   5.47
LONGEST FLOWPATH FROM NODE  18004.00 TO NODE  18003.00 =  1420.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  18003.00 TO NODE  18003.00 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.) =  12.61
RAINFALL INTENSITY(INCH/HR) =   5.08
TOTAL STREAM AREA(ACRES) =    11.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.79

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       41.92    13.29        4.908        24.40
    2       20.79    12.61        5.078        11.70

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       60.56    12.61       5.078
    2       62.02    13.29       4.908

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     62.02   Tc(MIN.) =   13.29
TOTAL AREA(ACRES) =     36.10
LONGEST FLOWPATH FROM NODE  18001.00 TO NODE  18003.00 =  2050.00 FEET.

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

```
 FLOW PROCESS FROM NODE  18003.00 TO NODE  18006.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =    325.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   770.00   CHANNEL SLOPE =  0.0974
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.470
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     71.41
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.18
 AVERAGE FLOW DEPTH(FEET) =   0.47   TRAVEL TIME(MIN.) =   2.08
 Tc(MIN.) =  15.37
 SUBAREA AREA(ACRES) =    12.00       SUBAREA RUNOFF(CFS) =   18.77
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     48.10         PEAK FLOW RATE(CFS) =      75.25

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   6.36
 LONGEST FLOWPATH FROM NODE  18001.00 TO NODE  18006.00 =  2820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  18006.00 TO NODE  18006.00 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.) =  15.37
 RAINFALL INTENSITY(INCH/HR) =   4.47
 TOTAL STREAM AREA(ACRES) =    48.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     75.25

****************************************************************************
 FLOW PROCESS FROM NODE  18007.00 TO NODE  18007.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    510.00
 DOWNSTREAM ELEVATION(FEET) =    499.00
 ELEVATION DIFFERENCE(FEET) =     11.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.67
 TOTAL AREA(ACRES) =      0.60   TOTAL RUNOFF(CFS) =      1.67

****************************************************************************
 FLOW PROCESS FROM NODE  18007.10 TO NODE  18008.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    425.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00   CHANNEL SLOPE =  0.1138
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.796
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.70
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   4.01
  Tc(MIN.) =  10.27
  SUBAREA AREA(ACRES) =     4.10       SUBAREA RUNOFF(CFS) =    8.32
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      4.70         PEAK FLOW RATE(CFS) =       9.53

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   3.18
  LONGEST FLOWPATH FROM NODE  18007.00 TO NODE  18008.00 =   750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  18008.00 TO NODE  18006.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    425.00  DOWNSTREAM(FEET) =    325.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00   CHANNEL SLOPE =  0.1111
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.805
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.33
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   3.47
  Tc(MIN.) =  13.74
  SUBAREA AREA(ACRES) =    12.10       SUBAREA RUNOFF(CFS) =   20.35
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     16.80         PEAK FLOW RATE(CFS) =      28.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   4.90
  LONGEST FLOWPATH FROM NODE  18007.00 TO NODE  18006.00 =  1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  18006.00 TO NODE  18006.00 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.) =  13.74
 RAINFALL INTENSITY(INCH/HR) =   4.80
 TOTAL STREAM AREA(ACRES) =    16.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.25

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        75.25    15.37        4.470         48.10
    2        28.25    13.74        4.805         16.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        98.25    13.74        4.805
    2       101.53    15.37        4.470

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    101.53   Tc(MIN.) =   15.37
 TOTAL AREA(ACRES) =     64.90
 LONGEST FLOWPATH FROM NODE  18001.00 TO NODE  18006.00 =  2820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  18006.00 TO NODE  18009.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    325.00  DOWNSTREAM(FEET) =    272.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1150.00   CHANNEL SLOPE =  0.0461
 CHANNEL BASE(FEET) =   60.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.824
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    126.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.56
 AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   4.20
 Tc(MIN.) =  19.57
 SUBAREA AREA(ACRES) =    37.90       SUBAREA RUNOFF(CFS) =   50.73
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =    102.80         PEAK FLOW RATE(CFS) =     137.60

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.47   FLOW VELOCITY(FEET/SEC.) =   4.69
 LONGEST FLOWPATH FROM NODE  18001.00 TO NODE  18009.00 =  3970.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  19001.00 TO NODE  19001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    910.00
 DOWNSTREAM ELEVATION(FEET) =    852.00
 ELEVATION DIFFERENCE(FEET) =     58.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      1.40
 TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
 FLOW PROCESS FROM NODE  19001.10 TO NODE  19002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    852.00  DOWNSTREAM(FEET) =    650.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.5771
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.757
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.39
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.18
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.83
 Tc(MIN.) =   8.10
 SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    4.02
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      2.20         PEAK FLOW RATE(CFS) =       5.20

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   3.54
 LONGEST FLOWPATH FROM NODE  19001.00 TO NODE  19002.00 =   450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  19002.00 TO NODE  19003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    650.00  DOWNSTREAM(FEET) =    278.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00   CHANNEL SLOPE =  0.3720
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.278
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.14
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.41
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   3.78
 Tc(MIN.) =  11.88
```

```
 SUBAREA AREA(ACRES) =    12.70       SUBAREA RUNOFF(CFS) =   23.46
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     14.90        PEAK FLOW RATE(CFS) =      27.53

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   5.57
 LONGEST FLOWPATH FROM NODE  19001.00 TO NODE  19003.00 =  1450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  20001.00 TO NODE  20001.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    837.50
 DOWNSTREAM ELEVATION(FEET) =    785.00
 ELEVATION DIFFERENCE(FEET) =     52.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE  20001.10 TO NODE  20002.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    575.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.5250
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.290
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.35
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.40
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   2.78
 Tc(MIN.) =   9.05
 SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    1.54
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      0.90        PEAK FLOW RATE(CFS) =       1.98

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.75
 LONGEST FLOWPATH FROM NODE  20001.00 TO NODE  20002.00 =   500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  20002.00 TO NODE  20003.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     575.00  DOWNSTREAM(FEET) =     270.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1300.00   CHANNEL SLOPE =  0.2346
  CHANNEL BASE(FEET) =    40.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =    2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.660
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     18.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    4.04
  AVERAGE FLOW DEPTH(FEET) =    0.11   TRAVEL TIME(MIN.) =    5.36
  Tc(MIN.) =  14.41
  SUBAREA AREA(ACRES) =     19.90       SUBAREA RUNOFF(CFS) =    32.45
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     20.80         PEAK FLOW RATE(CFS) =      33.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =    5.15
  LONGEST FLOWPATH FROM NODE  20001.00 TO NODE  20003.00 =  1800.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     20.80  TC(MIN.) =     14.41
  PEAK FLOW RATE(CFS)    =     33.92
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 4A:
CAMPUS PARK UPSTREAM – RATIONAL HYDROLOGY MAP (OFF-SITE)


SEE ON-SITE RATIONAL ANALYSIS FOR CONTINUATION
SEE SEC 5 FOR PRE-DEV ONSITE ANALYSIS
SEE SEC 6 FOR POST-DEV ONSITE ANALYSIS
SEE ON-SITE RATIONAL ANALYSIS FOR CONTINUATION
SEE SEC 5 FOR PRE-DEV ONSITE ANALYSIS
SEE SEC 6 FOR POST-DEV ONSITE ANALYSIS
SEE ON-SITE RATIONAL ANALYSIS FOR CONTINUATION
SEE SEC 5 FOR PRE-DEV ONSITE ANALYSIS
SEE SEC 6 FOR POST-DEV ONSITE ANALYSIS
RANCHO MONSERATE
MAP 1927
N
SCALE: 1" = 200'
CAMPUS PARK
UP STREAM
HYDROLOGY
MAP
SCALE
CONTOUR INT
U.S.C. & G.S. SEA
TWO THOUSAND FOOT CALIFORN
THE LAST THREE DIGITS OF TH
THE RECTANGULAR COORDINATE VALUES AR
THE GEOGRAPHIC VALUES ARE SHO

SECTION 5:
PRE-DEVELOPMENT CONDITIONS (ONSITE)
100-YEAR RATIONAL HYDROLOGY CALCULATIONS

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2004 Advanced Engineering Software (aes)
             Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                           Analysis prepared by:

                             LANDMARK CONSULTING
                         9555 GENESEE AVENUE, SUITE 200
                             SAN DEIGO, CA 92121
                              TEL:  858-587-8070

 ************************** DESCRIPTION OF STUDY **************************
* CAMPUS PARK, COUNTY OF SAN DIEGO                                        *
* ON-SITE, PRE-CONSTRUCTION CONDITIONS                                    *
* 100-YEAR STORM                                                          *
 **************************************************************************

  FILE NAME: 614EXC.DAT
  TIME/DATE OF STUDY: 18:22 05/06/2009
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    101.10 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    528.50
  DOWNSTREAM ELEVATION(FEET) =    514.00
  ELEVATION DIFFERENCE(FEET) =     14.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.40

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

```
 FLOW PROCESS FROM NODE    101.10 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    444.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   464.00   CHANNEL SLOPE =  0.1509
 CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =  15.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.567
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.19
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.52
 AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   2.20
 Tc(MIN.) =   8.46
 SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   11.49
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      5.50         PEAK FLOW RATE(CFS) =      12.64

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   4.41
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    102.00 =   564.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =   8.46
 RAINFALL INTENSITY(INCH/HR) =   6.57
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.64

****************************************************************************
 FLOW PROCESS FROM NODE   1002.00 TO NODE   1002.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   8.73   RAIN INTENSITY(INCH/HOUR) =  6.44
 TOTAL AREA(ACRES) =     1.60   TOTAL RUNOFF(CFS) =      3.61

****************************************************************************
 FLOW PROCESS FROM NODE   1002.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    770.00  DOWNSTREAM(FEET) =    444.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   991.00   CHANNEL SLOPE =  0.3290
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.187
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.13
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.76
 AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   3.47
 Tc(MIN.) =  12.20
 SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =    8.90
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      6.50         PEAK FLOW RATE(CFS) =      11.80
```

```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   5.59
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    102.00 =   991.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =  12.20
 RAINFALL INTENSITY(INCH/HR) =   5.19
 TOTAL STREAM AREA(ACRES) =     6.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.80

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       12.64     8.46        6.567          5.50
    2       11.80    12.20        5.187          6.50

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       20.83     8.46        6.567
    2       21.79    12.20        5.187

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     21.79   Tc(MIN.) =   12.20
 TOTAL AREA(ACRES) =     12.00
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    102.00 =   991.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    444.00  DOWNSTREAM(FEET) =    408.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   395.00   CHANNEL SLOPE =  0.0911
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.902
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     25.82
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.89
 AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   1.12
 Tc(MIN.) =  13.32
 SUBAREA AREA(ACRES) =     4.70       SUBAREA RUNOFF(CFS) =    8.06
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     16.70         PEAK FLOW RATE(CFS) =      28.66

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   6.15
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    103.00 =  1386.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =  13.32
  RAINFALL INTENSITY(INCH/HR) =   4.90
  TOTAL STREAM AREA(ACRES) =    16.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.66

****************************************************************************
  FLOW PROCESS FROM NODE   2003.00 TO NODE   2003.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  11.48   RAIN INTENSITY(INCH/HOUR) =  5.39
  TOTAL AREA(ACRES) =    15.80   TOTAL RUNOFF(CFS) =     29.84

****************************************************************************
  FLOW PROCESS FROM NODE   2003.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    602.00  DOWNSTREAM(FEET) =    408.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1427.00   CHANNEL SLOPE =  0.1359
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   6.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.616
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     48.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.57
  AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   3.14
  Tc(MIN.) =  14.62
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   36.67
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     38.50         PEAK FLOW RATE(CFS) =      62.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.34   FLOW VELOCITY(FEET/SEC.) =   8.34
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    103.00 =  2418.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =  14.62
  RAINFALL INTENSITY(INCH/HR) =   4.62
  TOTAL STREAM AREA(ACRES) =    38.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     62.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       28.66    13.32        4.902         16.70
      2       62.20    14.62        4.616         38.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       85.32    13.32        4.902
```

```
     2       89.19    14.62       4.616

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     89.19   Tc(MIN.) =   14.62
  TOTAL AREA(ACRES) =     55.20
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    103.00 =  2418.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    408.00  DOWNSTREAM(FEET) =    403.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0500
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.572
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     89.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.62
  AVERAGE FLOW DEPTH(FEET) =   0.67   TRAVEL TIME(MIN.) =   0.22
  Tc(MIN.) =  14.84
  SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    1.12
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     55.90         PEAK FLOW RATE(CFS) =      89.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   7.67
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =  2518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 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.) =  14.84
  RAINFALL INTENSITY(INCH/HR) =   4.57
  TOTAL STREAM AREA(ACRES) =    55.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     89.46

****************************************************************************
  FLOW PROCESS FROM NODE   3007.00 TO NODE   3007.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  11.93   RAIN INTENSITY(INCH/HOUR) =  5.26
  TOTAL AREA(ACRES) =    52.40   TOTAL RUNOFF(CFS) =     96.53

****************************************************************************
  FLOW PROCESS FROM NODE   3007.00 TO NODE    104.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    666.00  DOWNSTREAM(FEET) =    403.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2144.00   CHANNEL SLOPE =  0.1227
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.409
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
```

```
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    109.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.49
 AVERAGE FLOW DEPTH(FEET) =   0.43   TRAVEL TIME(MIN.) =   3.77
 Tc(MIN.) =  15.70
 SUBAREA AREA(ACRES) =    16.20       SUBAREA RUNOFF(CFS) =   25.00
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     68.60         PEAK FLOW RATE(CFS) =     105.87

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   9.34
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =  4562.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 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.) =  15.70
 RAINFALL INTENSITY(INCH/HR) =   4.41
 TOTAL STREAM AREA(ACRES) =    68.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    105.87

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       89.46    14.84        4.572         55.90
    2      105.87    15.70        4.409         68.60

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      189.55    14.84       4.572
    2      192.15    15.70       4.409

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    192.15   Tc(MIN.) =   15.70
 TOTAL AREA(ACRES) =    124.50
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =  4562.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    403.00  DOWNSTREAM(FEET) =    358.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   979.00   CHANNEL SLOPE =  0.0460
 CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.098
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    204.92
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.67
 AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   1.88
 Tc(MIN.) =  17.58
 SUBAREA AREA(ACRES) =    17.80       SUBAREA RUNOFF(CFS) =   25.53
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =    142.30         PEAK FLOW RATE(CFS) =     204.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
 DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =   8.70
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    105.00 =  5541.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   4003.00 TO NODE   4003.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  10.64   RAIN INTENSITY(INCH/HOUR) =  5.67
 TOTAL AREA(ACRES) =    10.70   TOTAL RUNOFF(CFS) =     21.22

****************************************************************************
 FLOW PROCESS FROM NODE   4003.00 TO NODE    106.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    620.00  DOWNSTREAM(FEET) =    464.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1362.00   CHANNEL SLOPE =  0.1145
 CHANNEL BASE(FEET) =   23.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.654
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     30.63
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.98
 AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   3.79
 Tc(MIN.) =  14.43
 SUBAREA AREA(ACRES) =    11.50       SUBAREA RUNOFF(CFS) =   18.73
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     22.20         PEAK FLOW RATE(CFS) =      36.17

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   6.38
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    106.00 =  6903.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   5007.00 TO NODE   5007.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  10.71   RAIN INTENSITY(INCH/HOUR) =  5.64
 TOTAL AREA(ACRES) =    47.50   TOTAL RUNOFF(CFS) =     93.82

****************************************************************************
 FLOW PROCESS FROM NODE   5007.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    590.00  DOWNSTREAM(FEET) =    580.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   124.00   CHANNEL SLOPE =  0.0806
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
```

```
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.563
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     94.31
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.69
 AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   0.24
 Tc(MIN.) =  10.95
 SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.97
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     48.00         PEAK FLOW RATE(CFS) =      93.82

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   8.68
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    107.00 =  7027.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 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.) =  10.95
 RAINFALL INTENSITY(INCH/HR) =   5.56
 TOTAL STREAM AREA(ACRES) =    48.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     93.82

****************************************************************************
 FLOW PROCESS FROM NODE   6006.00 TO NODE   6006.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   9.53   RAIN INTENSITY(INCH/HOUR) =  6.08
 TOTAL AREA(ACRES) =    18.00   TOTAL RUNOFF(CFS) =     66.30

****************************************************************************
 FLOW PROCESS FROM NODE   6006.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    590.00  DOWNSTREAM(FEET) =    580.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   111.00   CHANNEL SLOPE =  0.0901
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.988
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     66.51
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.85
 AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   0.24
 Tc(MIN.) =   9.77
 SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.42
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.603
 TOTAL AREA(ACRES) =     18.20         PEAK FLOW RATE(CFS) =      66.30

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   7.82
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    107.00 =  4673.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 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.) =    9.77
  RAINFALL INTENSITY(INCH/HR) =    5.99
  TOTAL STREAM AREA(ACRES) =    18.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     66.30

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY       AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       93.82     10.95         5.563         48.00
      2       66.30      9.77         5.988         18.20

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1      149.99      9.77         5.988
      2      155.41     10.95         5.563

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    155.41   Tc(MIN.) =   10.95
  TOTAL AREA(ACRES) =     66.20
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    107.00 =  7027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    580.00  DOWNSTREAM(FEET) =    464.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   921.00   CHANNEL SLOPE =  0.1260
  CHANNEL BASE(FEET) =   22.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.172
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    162.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.73
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.31
  Tc(MIN.) =  12.26
  SUBAREA AREA(ACRES) =     8.30       SUBAREA RUNOFF(CFS) =   15.02
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.412
  TOTAL AREA(ACRES) =     74.50         PEAK FLOW RATE(CFS) =     158.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =  11.59
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    106.00 =  7948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY       AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1      158.67     12.26         5.172         74.50
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    106.00 =  7948.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
```

```
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       36.17    14.43       4.654       22.20
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    106.00 =  6903.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      189.38      12.26        5.172
    2      178.95      14.43        4.654

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    189.38   Tc(MIN.) =   12.26
 TOTAL AREA(ACRES) =     96.70

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    358.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1631.00   CHANNEL SLOPE =  0.0650
 CHANNEL BASE(FEET) =   11.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.661
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    209.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.67
 AVERAGE FLOW DEPTH(FEET) =   1.23   TRAVEL TIME(MIN.) =   2.15
 Tc(MIN.) =  14.40
 SUBAREA AREA(ACRES) =    25.20       SUBAREA RUNOFF(CFS) =   41.11
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.388
 TOTAL AREA(ACRES) =    121.90         PEAK FLOW RATE(CFS) =     220.30

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.26   FLOW VELOCITY(FEET/SEC.) =  12.89
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    105.00 =  9579.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1      220.30    14.40       4.661       121.90
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    105.00 =  9579.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1      204.14    17.58       4.098       142.30
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    105.00 =  5541.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
```

```
     1     387.55      14.40        4.661
     2     397.86      17.58        4.098

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    397.86   Tc(MIN.) =   17.58
  TOTAL AREA(ACRES) =    264.20

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    108.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    358.00  DOWNSTREAM(FEET) =    342.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   430.00   CHANNEL SLOPE =  0.0372
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.997
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    403.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.32
  AVERAGE FLOW DEPTH(FEET) =   1.44   TRAVEL TIME(MIN.) =   0.69
  Tc(MIN.) =  18.27
  SUBAREA AREA(ACRES) =     7.60       SUBAREA RUNOFF(CFS) =   10.63
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.367
  TOTAL AREA(ACRES) =    271.80         PEAK FLOW RATE(CFS) =     398.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.42   FLOW VELOCITY(FEET/SEC.) =  10.32
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    108.00 = 10009.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =  18.27
  RAINFALL INTENSITY(INCH/HR) =   4.00
  TOTAL STREAM AREA(ACRES) =   271.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    398.68

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    556.90
  DOWNSTREAM ELEVATION(FEET) =    536.00
  ELEVATION DIFFERENCE(FEET) =     20.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    109.10 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    536.00  DOWNSTREAM(FEET) =    472.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   337.00   CHANNEL SLOPE =  0.1899
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  15.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.951
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.82
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.56
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   3.59
 Tc(MIN.) =   9.86
 SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    1.04
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      0.60         PEAK FLOW RATE(CFS) =       1.25

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   2.21
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    110.00 =   437.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    108.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    342.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2050.00   CHANNEL SLOPE =  0.0634
 CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.014
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.12
 AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   8.29
 Tc(MIN.) =  18.15
 SUBAREA AREA(ACRES) =    15.20       SUBAREA RUNOFF(CFS) =   21.36
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     15.80         PEAK FLOW RATE(CFS) =      22.20

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   5.14
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    108.00 =  2487.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =  18.15
 RAINFALL INTENSITY(INCH/HR) =   4.01
 TOTAL STREAM AREA(ACRES) =    15.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.20

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)     (ACRE)
     1       398.68     18.27        3.997         271.80
     2        22.20     18.15        4.014          15.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       418.23     18.15        4.014
     2       420.78     18.27        3.997

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    420.78   Tc(MIN.) =   18.27
  TOTAL AREA(ACRES) =    287.60
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    108.00 = 10009.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   342.00  DOWNSTREAM(FEET) =   326.00
  FLOW LENGTH(FEET) =   213.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.24
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    420.78
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  18.37
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    111.00 = 10222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    888.00
  DOWNSTREAM ELEVATION(FEET) =    880.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    880.00  DOWNSTREAM(FEET) =    390.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2481.00   CHANNEL SLOPE =  0.1975
  CHANNEL BASE(FEET) =   44.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.506
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     43.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.18
```

```
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   6.69
 Tc(MIN.) =  11.12
 SUBAREA AREA(ACRES) =    41.40       SUBAREA RUNOFF(CFS) =   79.79
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     41.50         PEAK FLOW RATE(CFS) =      79.98

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   7.91
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =  2531.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    390.00  DOWNSTREAM(FEET) =    344.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   863.00   CHANNEL SLOPE =  0.0533
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.790
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     89.95
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.36
 AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   2.68
 Tc(MIN.) =  13.81
 SUBAREA AREA(ACRES) =    11.90       SUBAREA RUNOFF(CFS) =   19.95
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     53.40         PEAK FLOW RATE(CFS) =      89.52

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   5.33
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =  3394.00 FEET.

+----------------------------------------------------------------------------+
| FLOW CONFLUENCES WITH OVERALL HORSE RANCH CREEK                             |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.00
 UPSTREAM ELEVATION(FEET) =    484.00
 DOWNSTREAM ELEVATION(FEET) =    476.00
 ELEVATION DIFFERENCE(FEET) =      8.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.168
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.028
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
 FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    350.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1870.00   CHANNEL SLOPE =  0.0674
```

```
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.107
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     25.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.25
 AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   7.33
 Tc(MIN.) =  12.50
 SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   47.55
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     26.70         PEAK FLOW RATE(CFS) =      47.72

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   5.33
 LONGEST FLOWPATH FROM NODE    301.00 TO NODE    303.00 =  1938.00 FEET.

+----------------------------------------------------------------------+
| FLOW CONFLUENCES WITH FLOW IN FORSE RANCH CREEK                       |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
 FLOW PROCESS FROM NODE  10006.00 TO NODE  10006.00 IS CODE =   7
----------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
======================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  13.67   RAIN INTENSITY(INCH/HOUR) =  4.82
 TOTAL AREA(ACRES) =    75.00   TOTAL RUNOFF(CFS) =    126.35

+----------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                        |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
 FLOW PROCESS FROM NODE  10006.00 TO NODE    401.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   444.00  DOWNSTREAM(FEET) =   426.00
 FLOW LENGTH(FEET) =   176.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  17.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  30.03
 GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    126.35
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  13.77
 LONGEST FLOWPATH FROM NODE    301.00 TO NODE    401.00 =  2114.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =  13.77
 RAINFALL INTENSITY(INCH/HR) =   4.80
 TOTAL STREAM AREA(ACRES) =    75.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    126.35

**********************************************************************
 FLOW PROCESS FROM NODE   9002.00 TO NODE   9002.00 IS CODE =   7
```

```
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.75   RAIN INTENSITY(INCH/HOUR) =  5.63
  TOTAL AREA(ACRES) =     1.00   TOTAL RUNOFF(CFS) =      2.00

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE   9002.00 TO NODE    401.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    456.00  DOWNSTREAM(FEET) =    426.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   216.00   CHANNEL SLOPE =  0.1389
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   6.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.213
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.66
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.35
  Tc(MIN.) =  12.11
  SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =    1.46
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.353
  TOTAL AREA(ACRES) =      1.80         PEAK FLOW RATE(CFS) =       3.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.80
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    401.00 =  2703.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =  12.11
  RAINFALL INTENSITY(INCH/HR) =   5.21
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      126.35    13.77        4.798         75.00
      2        3.31    12.11        5.213          1.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      114.42    12.11       5.213
      2      129.40    13.77       4.798

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =    129.40   Tc(MIN.) =   13.77
  TOTAL AREA(ACRES) =     76.80
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    401.00 =  2703.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    426.00  DOWNSTREAM(FEET) =    302.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2874.00   CHANNEL SLOPE =  0.0431
  CHANNEL BASE(FEET) =   60.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.568
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    170.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.97
  AVERAGE FLOW DEPTH(FEET) =   0.46   TRAVEL TIME(MIN.) =   8.02
  Tc(MIN.) =  21.79
  SUBAREA AREA(ACRES) =    64.60       SUBAREA RUNOFF(CFS) =   80.68
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =    141.40         PEAK FLOW RATE(CFS) =     176.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.47   FLOW VELOCITY(FEET/SEC.) =   6.09
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    402.00 =  5577.00 FEET.

+--------------------------------------------------------------------------+
| FLOW CONFLUENCES WITH HORSE RANCH CREEK                                  |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  11003.00 TO NODE  11003.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  13.47   RAIN INTENSITY(INCH/HOUR) =  4.87
  TOTAL AREA(ACRES) =    19.90   TOTAL RUNOFF(CFS) =     33.90

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  11003.00 TO NODE    501.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   429.60  DOWNSTREAM(FEET) =   424.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.57
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     33.90
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  13.52
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    501.00 =  5637.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    501.00 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.) =  13.52
  RAINFALL INTENSITY(INCH/HR) =   4.86
  TOTAL STREAM AREA(ACRES) =    19.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     33.90

****************************************************************************
  FLOW PROCESS FROM NODE  12003.00 TO NODE  12003.00 IS CODE =   7
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  12.58   RAIN INTENSITY(INCH/HOUR) =  5.09
  TOTAL AREA(ACRES) =    25.50   TOTAL RUNOFF(CFS) =     45.40

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  12003.00 TO NODE    501.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    428.00  DOWNSTREAM(FEET) =    424.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    30.00   CHANNEL SLOPE =  0.1333
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =     45.40
  FLOW VELOCITY(FEET/SEC.) =   7.53   FLOW DEPTH(FEET) =   0.29
  TRAVEL TIME(MIN.) =   0.07   Tc(MIN.) =  12.65
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    501.00 =  2733.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    501.00 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.) =  12.65
  RAINFALL INTENSITY(INCH/HR) =   5.07
  TOTAL STREAM AREA(ACRES) =    25.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       33.90    13.52        4.855         19.90
      2       45.40    12.65        5.068         25.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       77.11    12.65        5.068
      2       77.39    13.52        4.855
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     77.39   Tc(MIN.) =   13.52
 TOTAL AREA(ACRES) =     45.40
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    501.00 =  5637.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    424.00  DOWNSTREAM(FEET) =    296.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2968.00   CHANNEL SLOPE =  0.0431
 CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.569
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    103.38
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.99
 AVERAGE FLOW DEPTH(FEET) =   0.47   TRAVEL TIME(MIN.) =   8.26
 Tc(MIN.) =  21.78
 SUBAREA AREA(ACRES) =    41.30       SUBAREA RUNOFF(CFS) =   51.60
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     86.70         PEAK FLOW RATE(CFS) =     108.32

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   6.07
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    502.00 =  8605.00 FEET.

+--------------------------------------------------------------------------+
| FLOW CONFLUENCES WITH HORSE RANCH CREEK                                  |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE  13010.00 TO NODE  13010.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  16.58   RAIN INTENSITY(INCH/HOUR) =  4.26
 TOTAL AREA(ACRES) =    79.20   TOTAL RUNOFF(CFS) =    118.00

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE  13010.00 TO NODE    601.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    310.00  DOWNSTREAM(FEET) =    284.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   821.00   CHANNEL SLOPE =  0.0317
 CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.903
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    121.62
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.75
```

```
 AVERAGE FLOW DEPTH(FEET) =   0.57   TRAVEL TIME(MIN.) =   2.38
 Tc(MIN.) =  18.96
 SUBAREA AREA(ACRES) =     5.30       SUBAREA RUNOFF(CFS) =    7.24
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     84.50         PEAK FLOW RATE(CFS) =     118.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   5.72
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    601.00 =  9426.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    601.00 TO NODE    601.00 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.) =  18.96
 RAINFALL INTENSITY(INCH/HR) =   3.90
 TOTAL STREAM AREA(ACRES) =    84.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    118.00

****************************************************************************
 FLOW PROCESS FROM NODE  14003.00 TO NODE  14003.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  13.43   RAIN INTENSITY(INCH/HOUR) =  4.88
 TOTAL AREA(ACRES) =    18.20   TOTAL RUNOFF(CFS) =     31.60

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE  14003.00 TO NODE    601.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    289.00  DOWNSTREAM(FEET) =    284.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   281.00   CHANNEL SLOPE =  0.0178
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   6.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.552
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     33.83
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.10
 AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   1.51
 Tc(MIN.) =  14.94
 SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =    4.46
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.355
 TOTAL AREA(ACRES) =     21.00         PEAK FLOW RATE(CFS) =      33.96

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.34   FLOW VELOCITY(FEET/SEC.) =   3.11
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    601.00 =  3014.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    601.00 TO NODE    601.00 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.) =  14.94
  RAINFALL INTENSITY(INCH/HR) =   4.55
  TOTAL STREAM AREA(ACRES) =    21.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     33.96

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      118.00    18.96        3.903         84.50
      2       33.96    14.94        4.552         21.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      126.95    14.94        4.552
      2      147.12    18.96        3.903

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    147.12   Tc(MIN.) =   18.96
  TOTAL AREA(ACRES) =    105.50
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    601.00 =  9426.00 FEET.

+------------------------------------------------------------------------+
| FLOW CONFLUENCES WITH HORSE RANCH CREEK                                |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  15002.00 TO NODE  15002.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  13.58   RAIN INTENSITY(INCH/HOUR) =  4.84
  TOTAL AREA(ACRES) =     4.80   TOTAL RUNOFF(CFS) =      8.10

+------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                          |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  15002.00 TO NODE    701.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    302.00  DOWNSTREAM(FEET) =    300.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   195.00   CHANNEL SLOPE =  0.0077
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   6.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.434
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.64
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   1.98
  Tc(MIN.) =  15.56
  SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =    1.24
```

```
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.349
 TOTAL AREA(ACRES) =      5.60          PEAK FLOW RATE(CFS) =       8.66

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   1.63
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    701.00 =  9621.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    300.50  DOWNSTREAM(FEET) =    299.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   663.00   CHANNEL SLOPE =  0.0023
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.302
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.64
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.23
 AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   9.01
 Tc(MIN.) =  24.57
 SUBAREA AREA(ACRES) =     3.40       SUBAREA RUNOFF(CFS) =    3.93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.349
 TOTAL AREA(ACRES) =      9.00          PEAK FLOW RATE(CFS) =      10.38

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   1.20
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    702.00 = 10284.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    702.00 TO NODE    702.00 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.) =  24.57
 RAINFALL INTENSITY(INCH/HR) =   3.30
 TOTAL STREAM AREA(ACRES) =     9.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.38

****************************************************************************
 FLOW PROCESS FROM NODE  16002.00 TO NODE  16002.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  11.88   RAIN INTENSITY(INCH/HOUR) =  5.28
 TOTAL AREA(ACRES) =     4.20   TOTAL RUNOFF(CFS) =      7.76

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE  16002.00 TO NODE    702.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    311.00  DOWNSTREAM(FEET) =    299.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   189.00   CHANNEL SLOPE =  0.0635
```

```
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.993
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.85
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.96
 AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   1.07
 Tc(MIN.) =  12.95
 SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.17
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      4.30         PEAK FLOW RATE(CFS) =       7.76

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.92
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    702.00 =  3203.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    702.00 TO NODE    702.00 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.) =  12.95
 RAINFALL INTENSITY(INCH/HR) =   4.99
 TOTAL STREAM AREA(ACRES) =     4.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.76

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY       AREA
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1       10.38     24.57        3.302          9.00
    2        7.76     12.95        4.993          4.30

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1       13.23     12.95        4.993
    2       15.51     24.57        3.302

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     15.51   Tc(MIN.) =   24.57
 TOTAL AREA(ACRES) =     13.30
 LONGEST FLOWPATH FROM NODE    109.00 TO NODE    702.00 = 10284.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    702.00 TO NODE    703.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    299.00  DOWNSTREAM(FEET) =    276.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00   CHANNEL SLOPE =  0.0742
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.198
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     16.24
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.13
 AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   1.25
```

```
  Tc(MIN.) =  25.82
  SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =     1.46
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     14.60         PEAK FLOW RATE(CFS) =      16.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   4.15
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    703.00 = 10594.00 FEET.

+----------------------------------------------------------------------------+
| FLOW CONFLUENCES WITH HORSE RANCH CREEK                                    |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    320.70
  DOWNSTREAM ELEVATION(FEET) =    317.90
  ELEVATION DIFFERENCE(FEET) =      2.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.953
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.836
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    317.90  DOWNSTREAM(FEET) =    268.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1219.00   CHANNEL SLOPE =  0.0406
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.178
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.23
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   9.11
  Tc(MIN.) =  17.06
  SUBAREA AREA(ACRES) =    15.60       SUBAREA RUNOFF(CFS) =   22.81
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     15.70         PEAK FLOW RATE(CFS) =      22.96

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.88
  LONGEST FLOWPATH FROM NODE    801.00 TO NODE    803.00 =  1299.00 FEET.

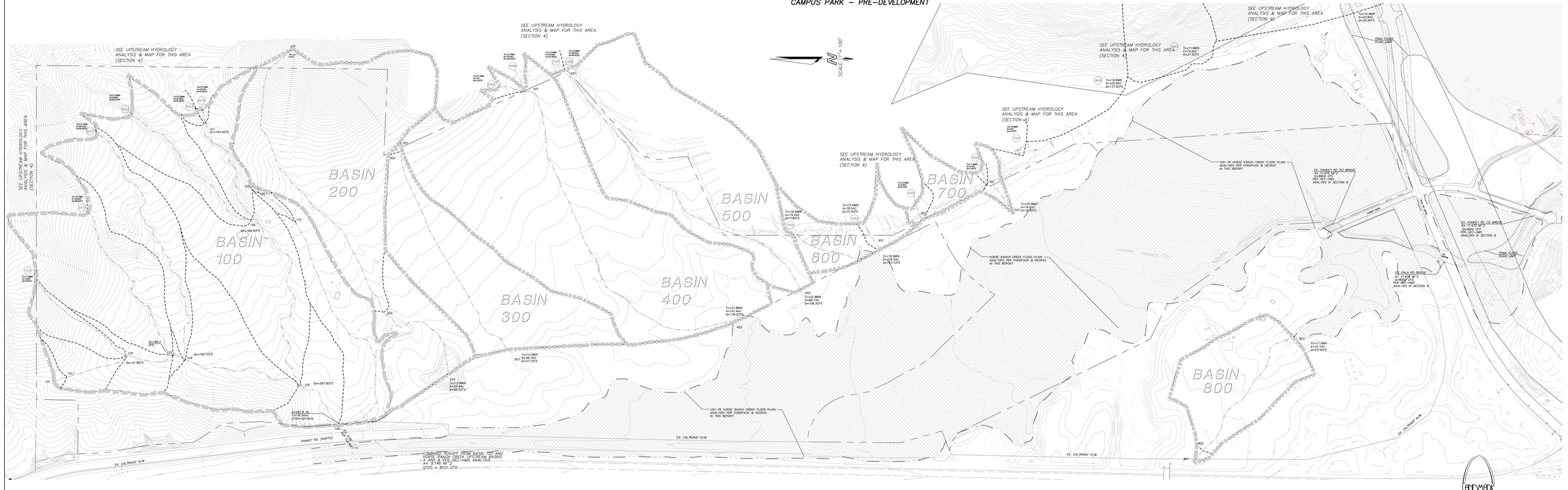
+----------------------------------------------------------------------------+
| FLOW CONFLUENCES WITH HORSE RANCH CREEK                                    |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     15.70  TC(MIN.) =     17.06
  PEAK FLOW RATE(CFS)   =     22.96
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

SECTION 5A:
PRE-DEVELOPMENT CONDITIONS
HYDROLOGY MAP (ON-SITE)

RATIONAL HYDROLOGY MAP FOR:

CAMPUS PARK – PRE-DEVELOPMENT



LEGEND

UPSTREAM ENDRUN NODE	100.3
NODE	103
SUB-BASIN BOUNDARY	
BASIN BOUNDARY	
FLOW PATH	
Qc	CONFLUENCED FLOW RATE
SUBDIVISION BNDY.	

SUB-BASIN AREAS

BASIN 100		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
101	101.1	0.5
101.1	102	3
1002	102	4.9
102	103	4.7
2003	103	22.7
103	104	0.7
3007	104	16.2
104	105	17.8
4003	106	11.5
5007	107	0.5
6006	107	0.2
107	106	8.3
106	108	25.2
105	108	7.8
109	109.1	0.1
109.1	110	0.5
110	108	15.2

BASIN 200		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
201	202	0.1
202	203	41.4
203	204	11.9

BASIN 300		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
301	302	0.1
302	303	26.6

BASIN 400		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
9002	401	0.8
401	402	64.6

BASIN 500		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
501	502	41.3

BASIN 600		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
13010	601	5.3
14003	601	2.3

BASIN 700		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
15002	701	0.8
701	702	3.4
16002	702	0.1
702	703	1.3

BASIN 800		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
801	802	0.1
802	803	15.6

LADYMAR CONSULTING
CIVIL ENGINEERING
2607 SAN JUAN AVENUE, STE. 200
SAN DIEGO, CA 92110 (619) 260-0775

PRE-DEVELOPMENT CONDITIONS

CAMPUS PARK

SECTION 6:
POST-DEVELOPMENT CONDITIONS (ONSITE)
100-YEAR RATIONAL HYDROLOGY CALCS

SECTION 6A:
BASIN 100

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2004 Advanced Engineering Software (aes)
              Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                              Analysis prepared by:

                                 LANDMARK CONSULTING
                             9555 GENESEE AVENUE, SUITE 200
                                 SAN DEIGO, CA 92121
                                  TEL:  858-587-8070

 ************************** DESCRIPTION OF STUDY **************************
* CAMPUS PARK, BASIN 100.1                                                *
* POST-DEVLOPMENT CONDITIONS                                              *
* 100-YEAR STORM                                                          *
 **************************************************************************

  FILE NAME: 614P0C.DAT
  TIME/DATE OF STUDY: 11:54 02/28/2009
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== ========
  1   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE   3007.00 TO NODE   3007.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  11.93   RAIN INTENSITY(INCH/HOUR) =  5.26
  TOTAL AREA(ACRES) =    52.40   TOTAL RUNOFF(CFS) =     96.53
```

```
+----------------------------------------------------------------------------+
| DATA PER UPSTREAM HYDROLOGY                                                |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE   3007.00 TO NODE    101.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    666.00  DOWNSTREAM(FEET) =    524.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1189.00   CHANNEL SLOPE =  0.1194
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.825
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    103.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.54
  AVERAGE FLOW DEPTH(FEET) =   1.38   TRAVEL TIME(MIN.) =   1.72
  Tc(MIN.) =  13.65
  SUBAREA AREA(ACRES) =     7.80       SUBAREA RUNOFF(CFS) =   13.17
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     60.20         PEAK FLOW RATE(CFS) =     101.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.37   FLOW VELOCITY(FEET/SEC.) =  11.55
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    101.00 =  1189.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   524.00  DOWNSTREAM(FEET) =   471.00
  FLOW LENGTH(FEET) =   313.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.05
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    101.68
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  13.80
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    102.00 =  1502.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =  13.80
  RAINFALL INTENSITY(INCH/HR) =   4.79
```

```
  TOTAL STREAM AREA(ACRES) =     60.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     101.68

****************************************************************************
  FLOW PROCESS FROM NODE   2003.00 TO NODE   2003.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  11.48   RAIN INTENSITY(INCH/HOUR) =  5.39
  TOTAL AREA(ACRES) =    15.80   TOTAL RUNOFF(CFS) =     29.84

+--------------------------------------------------------------------------+
| DATA PER UPSTREAM HYDROLOGY                                              |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE   2003.00 TO NODE    106.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    602.00  DOWNSTREAM(FEET) =    490.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   553.00   CHANNEL SLOPE =  0.2025
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.156
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     38.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.02
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   0.84
  Tc(MIN.) =  12.32
  SUBAREA AREA(ACRES) =     9.30       SUBAREA RUNOFF(CFS) =   16.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     25.10         PEAK FLOW RATE(CFS) =      45.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =  11.63
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    106.00 =   553.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   471.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     45.30
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  12.43
```

```
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    103.00 =   703.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   471.50  DOWNSTREAM(FEET) =   471.00
 FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.73
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     45.30
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  12.46
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    102.00 =   727.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =  12.46
 RAINFALL INTENSITY(INCH/HR) =   5.12
 TOTAL STREAM AREA(ACRES) =    25.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.30

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1       101.68     13.80         4.791          60.20
     2        45.30     12.46         5.116          25.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1       137.13     12.46         5.116
     2       144.10     13.80         4.791

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    144.10   Tc(MIN.) =   13.80
 TOTAL AREA(ACRES) =     85.30
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    102.00 =  1502.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   441.50
```

```
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.17
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    144.10
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =  14.24
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =  2117.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 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.) =  14.24
  RAINFALL INTENSITY(INCH/HR) =   4.69
  TOTAL STREAM AREA(ACRES) =    85.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    144.10

****************************************************************************
  FLOW PROCESS FROM NODE   1002.00 TO NODE   1002.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   8.73   RAIN INTENSITY(INCH/HOUR) =  6.44
  TOTAL AREA(ACRES) =     1.60   TOTAL RUNOFF(CFS) =      3.61

+--------------------------------------------------------------------------+
| DATA PER UPSTREAM HYDROLOGY                                              |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE   1002.00 TO NODE    112.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    770.00  DOWNSTREAM(FEET) =    474.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1090.00   CHANNEL SLOPE =  0.2716
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.139
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     13.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.98
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   3.65
  Tc(MIN.) =  12.38
  SUBAREA AREA(ACRES) =    10.50       SUBAREA RUNOFF(CFS) =   18.89
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     12.10         PEAK FLOW RATE(CFS) =      21.77
```

```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   5.79
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    112.00 =  1817.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   444.00
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  34.13
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.77
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  12.41
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    113.00 =  1882.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   444.00  DOWNSTREAM(FEET) =   441.50
 FLOW LENGTH(FEET) =   137.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.13
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.77
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =  12.64
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =  2019.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 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.) =  12.64
 RAINFALL INTENSITY(INCH/HR) =   5.07
 TOTAL STREAM AREA(ACRES) =    12.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.77

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1      144.10    14.24        4.694         85.30
    2       21.77    12.64        5.071         12.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)
    1       155.15    12.64       5.071
    2       164.25    14.24       4.694

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    164.25   Tc(MIN.) =   14.24
 TOTAL AREA(ACRES) =     97.40
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =  2117.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   441.50  DOWNSTREAM(FEET) =   441.00
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.95
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    164.25
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =  14.25
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    105.00 =  2128.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 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.) =  14.25
 RAINFALL INTENSITY(INCH/HR) =   4.69
 TOTAL STREAM AREA(ACRES) =    97.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    164.25

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    497.60
 DOWNSTREAM ELEVATION(FEET) =    496.80
 ELEVATION DIFFERENCE(FEET) =      0.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.503
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

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

```
 FLOW PROCESS FROM NODE    107.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  496.80  DOWNSTREAM ELEVATION(FEET) =  447.00
 STREET LENGTH(FEET) =  1140.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =      19.13
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.47
   HALFSTREET FLOOD WIDTH(FEET) =   16.96
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.39
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.97
 STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   5.48
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.574
 SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   36.18
 TOTAL AREA(ACRES) =      7.40        PEAK FLOW RATE(CFS) =      36.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.00
 FLOW VELOCITY(FEET/SEC.) =  6.63   DEPTH*VELOCITY(FT*FT/SEC.) =   3.22
 LONGEST FLOWPATH FROM NODE    106.00 TO NODE    105.00 =  1190.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 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.) =   5.48
 RAINFALL INTENSITY(INCH/HR) =   8.70
 TOTAL STREAM AREA(ACRES) =     7.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.94

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1       164.25     14.25         4.692          97.40
     2        36.94      5.48         8.695           7.40
```

```
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       125.57     5.48       8.695
    2       184.18    14.25       4.692

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    184.18   Tc(MIN.) =   14.25
 TOTAL AREA(ACRES) =    104.80
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    105.00 =  2128.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   441.00  DOWNSTREAM(FEET) =   439.90
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.37
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    184.18
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =  14.39
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    114.00 =  2238.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   439.90  DOWNSTREAM(FEET) =   413.00
 FLOW LENGTH(FEET) =   426.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  26.97
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    184.18
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =  14.65
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    115.00 =  2664.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.609
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3656
 SUBAREA AREA(ACRES) =    1.90   SUBAREA RUNOFF(CFS) =    3.07
 TOTAL AREA(ACRES) =    106.70   TOTAL RUNOFF(CFS) =  184.18
 TC(MIN.) =  14.65
```

```
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   398.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.96
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    184.18
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =  14.85
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    115.10 =  2964.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.10 TO NODE    115.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.569
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3655
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.12
  TOTAL AREA(ACRES) =    107.40   TOTAL RUNOFF(CFS) =  184.18
  TC(MIN.) =  14.85
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

+--------------------------------------------------------------------------+
| RUNOFF ENTERS CONCRETE DITCH                                             |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =    107.40  TC(MIN.) =     14.85
  PEAK FLOW RATE(CFS)    =    184.18
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2004 Advanced Engineering Software (aes)
              Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                              Analysis prepared by:

                                LANDMARK CONSULTING
                           9555 GENESEE AVENUE, SUITE 200
                                SAN DEIGO, CA 92121
                                 TEL:  858-587-8070

 ************************** DESCRIPTION OF STUDY **************************
* CAMPUS PARK, BASIN 100                                                  *
* POST-DEVELOPMENT CONDITIONS                                             *
* 100-YEAR STORM                                                          *
 **************************************************************************

  FILE NAME: 614P1C.DAT
  TIME/DATE OF STUDY: 15:59 05/06/2009
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.10 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    499.00
  DOWNSTREAM ELEVATION(FEET) =    497.60
  ELEVATION DIFFERENCE(FEET) =      1.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.335
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.916
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

**************************************************************************
  FLOW PROCESS FROM NODE    108.10 TO NODE    109.00 IS CODE =  62
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  497.60  DOWNSTREAM ELEVATION(FEET) =  493.80
  STREET LENGTH(FEET) =   226.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =   7.88
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.877
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.96
  TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       2.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.68
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    109.00 =   296.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  493.80  DOWNSTREAM ELEVATION(FEET) =  473.20
  STREET LENGTH(FEET) =   406.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       4.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.73
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =   9.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.175
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
```

```
  SUBAREA AREA(ACRES) =     1.10      SUBAREA RUNOFF(CFS) =     3.87
  TOTAL AREA(ACRES) =       1.70        PEAK FLOW RATE(CFS) =        5.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.26
  FLOW VELOCITY(FEET/SEC.) =  5.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    110.00 =   702.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    123.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  473.20  DOWNSTREAM ELEVATION(FEET) =  447.30
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       6.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.00
  STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =  10.06
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.873
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.587
  SUBAREA AREA(ACRES) =     0.10      SUBAREA RUNOFF(CFS) =     0.51
  TOTAL AREA(ACRES) =       1.80        PEAK FLOW RATE(CFS) =        6.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.19
  FLOW VELOCITY(FEET/SEC.) =  6.44   DEPTH*VELOCITY(FT*FT/SEC.) =   2.00
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    123.00 =   992.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 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.) =  10.06
  RAINFALL INTENSITY(INCH/HR) =   5.87
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.20

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
```

```
 UPSTREAM ELEVATION(FEET) =    462.70
 DOWNSTREAM ELEVATION(FEET) =    462.51
 ELEVATION DIFFERENCE(FEET) =      0.19
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.499
 WARNING: THE MINIMUM OVERLAND FLOW SLOPE, 0.5%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.549
 SUBAREA RUNOFF(CFS) =      0.37
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
 FLOW PROCESS FROM NODE    121.10 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  462.51  DOWNSTREAM ELEVATION(FEET) =  461.90
 STREET LENGTH(FEET) =   161.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.35
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.44
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
 STREET FLOW TRAVEL TIME(MIN.) =   2.00   Tc(MIN.) =  10.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.714
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.95
 TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       2.28

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.78
 FLOW VELOCITY(FEET/SEC.) =  1.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
 LONGEST FLOWPATH FROM NODE    121.00 TO NODE    122.00 =   211.00 FEET.

****************************************************************************
 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) =  461.90  DOWNSTREAM ELEVATION(FEET) =  447.00
 STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.44
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.49
  STREET FLOW TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =  11.44
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.407
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    4.32
  TOTAL AREA(ACRES) =      2.10        PEAK FLOW RATE(CFS) =       6.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.46
  FLOW VELOCITY(FEET/SEC.) =  5.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.79
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    123.00 =   486.00 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 =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.44
  RAINFALL INTENSITY(INCH/HR) =   5.41
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.47

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.20    10.06        5.873          1.80
      2        6.47    11.44        5.407          2.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.90    10.06       5.873
      2       12.18    11.44       5.407

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     12.18   Tc(MIN.) =   11.44
  TOTAL AREA(ACRES) =      3.90
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    123.00 =   992.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    116.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   441.00  DOWNSTREAM(FEET) =   422.50
  FLOW LENGTH(FEET) =   391.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.62
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     12.18
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =  11.96
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    116.00 =  1383.00 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.) =  11.96
  RAINFALL INTENSITY(INCH/HR) =   5.26
  TOTAL STREAM AREA(ACRES) =     3.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.18

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    468.00
  DOWNSTREAM ELEVATION(FEET) =    461.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.982
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    119.10 TO NODE    120.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  446.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =   2.69
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.670
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.05
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.23
  FLOW VELOCITY(FEET/SEC.) =  4.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
```

```
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    120.00 =   280.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  446.50  DOWNSTREAM ELEVATION(FEET) =  428.00
 STREET LENGTH(FEET) =   357.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       7.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   10.97
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.38
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.86
 STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =   3.79
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.583
 SUBAREA AREA(ACRES) =    2.00      SUBAREA RUNOFF(CFS) =   10.51
 TOTAL AREA(ACRES) =      2.30        PEAK FLOW RATE(CFS) =      12.37

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.76
 FLOW VELOCITY(FEET/SEC.) =  6.15   DEPTH*VELOCITY(FT*FT/SEC.) =   2.47
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    116.00 =   637.00 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.) =   3.79
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     2.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.37

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       12.18    11.96        5.256          3.90
    2       12.37     3.79        9.222          2.30

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       19.31     3.79        9.222
```

```
    2       19.23    11.96       5.256

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     19.31   Tc(MIN.) =    3.79
  TOTAL AREA(ACRES) =      6.20
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    116.00 =  1383.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   422.50  DOWNSTREAM(FEET) =   407.00
  FLOW LENGTH(FEET) =   288.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     19.31
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   4.12
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    130.00 =  1671.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    427.20
  DOWNSTREAM ELEVATION(FEET) =    426.20
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.233
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.000
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    131.10 TO NODE    132.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.20  DOWNSTREAM ELEVATION(FEET) =  424.90
  STREET LENGTH(FEET) =   118.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.21
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =   7.21
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.284
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.66
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       2.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  2.22   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE    131.00 TO NODE    132.00 =   178.00 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) =  424.90  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   433.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       5.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.82   Tc(MIN.) =   9.03
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.298
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    6.82
  TOTAL AREA(ACRES) =      2.40        PEAK FLOW RATE(CFS) =       8.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.56
  FLOW VELOCITY(FEET/SEC.) =  4.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    131.00 TO NODE    133.00 =   611.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 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.) =   9.03
  RAINFALL INTENSITY(INCH/HR) =   6.30
  TOTAL STREAM AREA(ACRES) =     2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.62

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

```
 FLOW PROCESS FROM NODE    134.00 TO NODE    134.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    462.90
 DOWNSTREAM ELEVATION(FEET) =    462.30
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
 SUBAREA RUNOFF(CFS) =      0.41
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE    134.10 TO NODE    135.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  462.30  DOWNSTREAM ELEVATION(FEET) =  458.30
 STREET LENGTH(FEET) =   156.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.98
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    4.97
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.67
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
 STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =   8.36
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.617
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.13
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.51

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.35
 FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    135.00 =   216.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    135.00 TO NODE    133.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  458.30  DOWNSTREAM ELEVATION(FEET) =  413.00
 STREET LENGTH(FEET) =   800.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
 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) =       4.19
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.58
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.91
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.46
 STREET FLOW TRAVEL TIME(MIN.) =   2.72   Tc(MIN.) =  11.08
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.520
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =     1.70      SUBAREA RUNOFF(CFS) =     5.35
 TOTAL AREA(ACRES) =       2.10        PEAK FLOW RATE(CFS) =       6.61

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.46
 FLOW VELOCITY(FEET/SEC.) =  5.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.83
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    133.00 =  1016.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 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.) =  11.08
 RAINFALL INTENSITY(INCH/HR) =   5.52
 TOTAL STREAM AREA(ACRES) =     2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.61

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         8.62     9.03        6.298         2.40
    2         6.61    11.08        5.520         2.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        14.00     9.03       6.298
    2        14.16    11.08       5.520

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     14.16   Tc(MIN.) =   11.08
 TOTAL AREA(ACRES) =      4.50
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    133.00 =  1016.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    133.00 TO NODE    136.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.50
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.83
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.16
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  11.16
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    136.00 =  1056.00 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.) =  11.16
 RAINFALL INTENSITY(INCH/HR) =   5.49
 TOTAL STREAM AREA(ACRES) =     4.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.16

****************************************************************************
 FLOW PROCESS FROM NODE    137.00 TO NODE    137.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    426.90
 DOWNSTREAM ELEVATION(FEET) =    426.30
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
 SUBAREA RUNOFF(CFS) =      0.41
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE    137.10 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  426.30  DOWNSTREAM ELEVATION(FEET) =  424.10
 STREET LENGTH(FEET) =   167.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.33
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
 STREET FLOW TRAVEL TIME(MIN.) =   1.19   Tc(MIN.) =   8.58
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.509
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.97
 TOTAL AREA(ACRES) =      0.90        PEAK FLOW RATE(CFS) =       3.34
```

```
 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.66
 FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
 LONGEST FLOWPATH FROM NODE    137.00 TO NODE    138.00 =   227.00 FEET.

****************************************************************************
 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) =  424.10  DOWNSTREAM ELEVATION(FEET) =  420.40
 STREET LENGTH(FEET) =   294.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       6.16
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.40
   HALFSTREET FLOOD WIDTH(FEET) =   13.86
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.02
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
 STREET FLOW TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =  10.20
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.822
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    5.64
 TOTAL AREA(ACRES) =      2.60        PEAK FLOW RATE(CFS) =       8.63

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.84
 FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
 LONGEST FLOWPATH FROM NODE    137.00 TO NODE    139.00 =   521.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    139.00 TO NODE    136.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  420.40  DOWNSTREAM ELEVATION(FEET) =  413.00
 STREET LENGTH(FEET) =   272.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       8.94
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.40
   HALFSTREET FLOOD WIDTH(FEET) =   13.76
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =     4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =     1.78
  STREET FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =  11.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.474
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.62
  TOTAL AREA(ACRES) =       2.80        PEAK FLOW RATE(CFS) =       8.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.66
  FLOW VELOCITY(FEET/SEC.) =  4.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.76
  LONGEST FLOWPATH FROM NODE    137.00 TO NODE    136.00 =   793.00 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.) =  11.22
  RAINFALL INTENSITY(INCH/HR) =   5.47
  TOTAL STREAM AREA(ACRES) =     2.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.74

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       14.16    11.16        5.493          4.50
      2        8.74    11.22        5.474          2.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       22.85    11.16       5.493
      2       22.85    11.22       5.474

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     22.85   Tc(MIN.) =   11.16
  TOTAL AREA(ACRES) =      7.30
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    136.00 =  1056.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =    49.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     22.85
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  11.26
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    130.00 =  1105.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
      1        22.85     11.26        5.461         7.30
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    130.00 =  1105.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
      1        19.31      4.12        9.222         6.20
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    130.00 =  1671.60 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       27.67       4.12         9.222
      2       34.29      11.26         5.461

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     34.29   Tc(MIN.) =   11.26
  TOTAL AREA(ACRES) =     13.50

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   376.00
  FLOW LENGTH(FEET) =   556.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.55
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     34.29
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =  11.82
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    140.00 =  2227.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    141.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    413.80
  DOWNSTREAM ELEVATION(FEET) =    413.20
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    141.10 TO NODE    142.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.20  DOWNSTREAM ELEVATION(FEET) =  409.20
  STREET LENGTH(FEET) =   131.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       0.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =   8.14
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.733
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.15
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.09
  FLOW VELOCITY(FEET/SEC.) =  3.14   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    142.00 =   191.00 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) =  409.20  DOWNSTREAM ELEVATION(FEET) =  383.00
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.07   Tc(MIN.) =   9.21
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.218
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     1.40      SUBAREA RUNOFF(CFS) =     4.96
  TOTAL AREA(ACRES) =       1.80        PEAK FLOW RATE(CFS) =       6.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.70
  FLOW VELOCITY(FEET/SEC.) =  6.03   DEPTH*VELOCITY(FT*FT/SEC.) =   1.93
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =   541.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 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.) =   9.21
  RAINFALL INTENSITY(INCH/HR) =   6.22
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.38

****************************************************************************
  FLOW PROCESS FROM NODE   1431.00 TO NODE   1431.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    433.20
  DOWNSTREAM ELEVATION(FEET) =    432.60
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE   1431.10 TO NODE   1432.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.60  DOWNSTREAM ELEVATION(FEET) =  424.20
  STREET LENGTH(FEET) =   152.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       0.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.74
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   0.68   Tc(MIN.) =   8.07
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.773
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     1.16
  TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =       1.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.18
  FLOW VELOCITY(FEET/SEC.) =  4.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE   1431.00 TO NODE   1432.00 =   212.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1432.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  424.20  DOWNSTREAM ELEVATION(FEET) =  383.00
  STREET LENGTH(FEET) =   487.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       4.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =   9.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.105
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     1.50      SUBAREA RUNOFF(CFS) =     5.22
  TOTAL AREA(ACRES) =       1.90        PEAK FLOW RATE(CFS) =       6.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.60
  FLOW VELOCITY(FEET/SEC.) =  6.36   DEPTH*VELOCITY(FT*FT/SEC.) =   2.02
  LONGEST FLOWPATH FROM NODE   1431.00 TO NODE    143.00 =   699.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 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.) =   9.48
  RAINFALL INTENSITY(INCH/HR) =   6.11
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.61

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.38     9.21        6.218          1.80
      2        6.61     9.48        6.105          1.90
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       12.81     9.21       6.218
      2       12.88     9.48       6.105

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     12.88   Tc(MIN.) =    9.48
  TOTAL AREA(ACRES) =      3.70
  LONGEST FLOWPATH FROM NODE   1431.00 TO NODE    143.00 =   699.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   376.50  DOWNSTREAM(FEET) =   376.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.70
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     12.88
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.56
  LONGEST FLOWPATH FROM NODE   1431.00 TO NODE    140.00 =   739.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    144.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    461.70
  DOWNSTREAM ELEVATION(FEET) =    461.10
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    144.10 TO NODE    145.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.10  DOWNSTREAM ELEVATION(FEET) =  450.60
  STREET LENGTH(FEET) =   183.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.56
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.18
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.04
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
 STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =   8.14
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.732
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    2.30
 TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       2.69

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.90
 FLOW VELOCITY(FEET/SEC.) =  4.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
 LONGEST FLOWPATH FROM NODE    144.00 TO NODE    145.00 =   243.00 FEET.

****************************************************************************
 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) =  450.60  DOWNSTREAM ELEVATION(FEET) =  429.00
 STREET LENGTH(FEET) =   291.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       5.21
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.88
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.74
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.74
 STREET FLOW TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =   8.99
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.317
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    5.04
 TOTAL AREA(ACRES) =      2.10        PEAK FLOW RATE(CFS) =       7.56

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.46
 FLOW VELOCITY(FEET/SEC.) =  6.24   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
 LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =   534.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 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.) =   8.99
 RAINFALL INTENSITY(INCH/HR) =   6.32
 TOTAL STREAM AREA(ACRES) =     2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.56

****************************************************************************
 FLOW PROCESS FROM NODE    147.00 TO NODE    147.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    498.40
 DOWNSTREAM ELEVATION(FEET) =    497.80
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
 SUBAREA RUNOFF(CFS) =      0.41
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE    147.10 TO NODE    148.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  497.80  DOWNSTREAM ELEVATION(FEET) =  491.00
 STREET LENGTH(FEET) =   171.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.17
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    4.81
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
 STREET FLOW TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =   8.24
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.681
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.52
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.40
 FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    148.00 =   231.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    148.00 TO NODE   1481.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  491.00  DOWNSTREAM ELEVATION(FEET) =  470.00
 STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.44
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    9.24
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.57
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.42
 STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =   9.92
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.929
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    5.07
 TOTAL AREA(ACRES) =      2.00        PEAK FLOW RATE(CFS) =       6.76

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.02
 FLOW VELOCITY(FEET/SEC.) =  5.07   DEPTH*VELOCITY(FT*FT/SEC.) =   1.76
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE   1481.00 =   691.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1481.00 TO NODE   1482.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  470.00  DOWNSTREAM ELEVATION(FEET) =  447.80
 STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       7.08
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =   10.21
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.11
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.02
 STREET FLOW TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =  10.76
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.624
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.64
 TOTAL AREA(ACRES) =      2.20        PEAK FLOW RATE(CFS) =       7.05

 END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.21
 FLOW VELOCITY(FEET/SEC.) =  6.08   DEPTH*VELOCITY(FT*FT/SEC.) =   2.01
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE   1482.00 =  1001.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1482.00 TO NODE    146.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  447.80  DOWNSTREAM ELEVATION(FEET) =  429.00
 STREET LENGTH(FEET) =   312.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       8.73
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.58
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.99
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.14
 STREET FLOW TRAVEL TIME(MIN.) =   0.87   Tc(MIN.) =  11.63
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.349
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    3.35
 TOTAL AREA(ACRES) =      3.30        PEAK FLOW RATE(CFS) =      10.06

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.29
 FLOW VELOCITY(FEET/SEC.) =  6.18   DEPTH*VELOCITY(FT*FT/SEC.) =   2.30
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    146.00 =  1313.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 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.) =  11.63
 RAINFALL INTENSITY(INCH/HR) =   5.35
 TOTAL STREAM AREA(ACRES) =     3.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.06

****************************************************************************
 FLOW PROCESS FROM NODE    149.00 TO NODE    149.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    461.90
 DOWNSTREAM ELEVATION(FEET) =    461.30
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
 SUBAREA RUNOFF(CFS) =      0.41
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE    149.10 TO NODE    150.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  461.30  DOWNSTREAM ELEVATION(FEET) =  451.30
 STREET LENGTH(FEET) =   156.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.99
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    3.55
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.05
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
 STREET FLOW TRAVEL TIME(MIN.) =   0.64   Tc(MIN.) =   8.03
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.793
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.16
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.55

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   4.97
 FLOW VELOCITY(FEET/SEC.) =  4.24   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    149.00 TO NODE    150.00 =   216.00 FEET.

****************************************************************************
 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) =  451.30  DOWNSTREAM ELEVATION(FEET) =  430.50
 STREET LENGTH(FEET) =   278.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       2.81
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.60
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.08
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =   8.94
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.338
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.53
 TOTAL AREA(ACRES) =      1.10        PEAK FLOW RATE(CFS) =       3.97

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.82
 FLOW VELOCITY(FEET/SEC.) =  5.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
 LONGEST FLOWPATH FROM NODE    149.00 TO NODE    151.00 =   494.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    151.00 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) =   424.50  DOWNSTREAM(FEET) =   424.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.53
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.97
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   9.08
 LONGEST FLOWPATH FROM NODE    149.00 TO NODE    146.00 =   539.00 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 =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.08
 RAINFALL INTENSITY(INCH/HR) =   6.28
 TOTAL STREAM AREA(ACRES) =     1.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.97

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        7.56     8.99        6.317         2.10
     2       10.06    11.63        5.349         3.30
     3        3.97     9.08        6.276         1.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       19.27     8.99       6.317
     2       19.34     9.08       6.276
     3       19.85    11.63       5.349

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     19.85   Tc(MIN.) =   11.63
 TOTAL AREA(ACRES) =      6.50
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    146.00 =  1313.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    146.00 TO NODE   1511.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   424.00  DOWNSTREAM(FEET) =   397.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     19.85
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =  11.93
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE   1511.00 =  1633.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1511.00 TO NODE   1511.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    152.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    451.50
  DOWNSTREAM ELEVATION(FEET) =    450.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.677
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    152.10 TO NODE    153.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  448.00
  STREET LENGTH(FEET) =   123.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =   5.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.721
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.99
```

```
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.40
 FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    153.00 =   173.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  448.00  DOWNSTREAM ELEVATION(FEET) =  427.60
 STREET LENGTH(FEET) =   219.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       2.41
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.79
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
 STREET FLOW TRAVEL TIME(MIN.) =   0.69   Tc(MIN.) =   6.14
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.080
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.84
 TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       3.22

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.70
 FLOW VELOCITY(FEET/SEC.) =  5.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.48
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =   392.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  427.60  DOWNSTREAM ELEVATION(FEET) =  405.00
 STREET LENGTH(FEET) =   212.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    8.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.87
  STREET FLOW TRAVEL TIME(MIN.) =   0.54   Tc(MIN.) =   6.68
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.651
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    3.49
  TOTAL AREA(ACRES) =      1.50        PEAK FLOW RATE(CFS) =       6.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.09
  FLOW VELOCITY(FEET/SEC.) =  6.93   DEPTH*VELOCITY(FT*FT/SEC.) =   2.13
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =   604.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 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.) =   6.68
  RAINFALL INTENSITY(INCH/HR) =   7.65
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.54

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    421.30
  DOWNSTREAM ELEVATION(FEET) =    420.70
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    162.10 TO NODE    163.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.70  DOWNSTREAM ELEVATION(FEET) =  419.30
  STREET LENGTH(FEET) =   118.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       0.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    4.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =   8.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.561
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.33
  FLOW VELOCITY(FEET/SEC.) =  1.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
  LONGEST FLOWPATH FROM NODE    162.00 TO NODE    163.00 =   178.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    161.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  419.30  DOWNSTREAM ELEVATION(FEET) =  409.00
  STREET LENGTH(FEET) =   530.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   3.20   Tc(MIN.) =  11.68
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.336
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.43
  TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       3.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    162.00 TO NODE    161.00 =   708.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    155.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  409.00  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   225.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
```

```
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       6.06
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.79
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.32
 STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =  12.76
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.039
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    6.03
 TOTAL AREA(ACRES) =      3.10        PEAK FLOW RATE(CFS) =       8.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.98
 FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.61
 LONGEST FLOWPATH FROM NODE    162.00 TO NODE    155.00 =   933.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 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.) =  12.76
 RAINFALL INTENSITY(INCH/HR) =   5.04
 TOTAL STREAM AREA(ACRES) =     3.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.90

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    421.30
 DOWNSTREAM ELEVATION(FEET) =    420.70
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
 SUBAREA RUNOFF(CFS) =      0.41
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE    165.10 TO NODE    166.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  420.70  DOWNSTREAM ELEVATION(FEET) =  419.30
 STREET LENGTH(FEET) =   173.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
```

```
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.76
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    5.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.60
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
 STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =   9.19
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.228
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.71
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.06

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.11
 FLOW VELOCITY(FEET/SEC.) =  1.71   DEPTH*VELOCITY(FT*FT/SEC.) =   0.46
 LONGEST FLOWPATH FROM NODE    165.00 TO NODE    166.00 =   233.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    166.00 TO NODE    164.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  419.30  DOWNSTREAM ELEVATION(FEET) =  405.00
 STREET LENGTH(FEET) =   377.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       7.43
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.93
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.82
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.76
 STREET FLOW TRAVEL TIME(MIN.) =   1.30   Tc(MIN.) =  10.49
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.717
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =   12.71
 TOTAL AREA(ACRES) =      4.20        PEAK FLOW RATE(CFS) =      13.69

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.28
 FLOW VELOCITY(FEET/SEC.) =  5.58   DEPTH*VELOCITY(FT*FT/SEC.) =   2.41
 LONGEST FLOWPATH FROM NODE    165.00 TO NODE    164.00 =   610.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    164.00 TO NODE    155.00 IS CODE =  31
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.50  DOWNSTREAM(FEET) =   398.00
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.95
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     13.69
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  10.57
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    155.00 =   648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 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.) =  10.57
  RAINFALL INTENSITY(INCH/HR) =   5.69
  TOTAL STREAM AREA(ACRES) =     4.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.69

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.54     6.68        7.651          1.50
      2        8.90    12.76        5.039          3.10
      3       13.69    10.57        5.689          4.20

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       19.85     6.68       7.651
      2       25.93    10.57       5.689
      3       25.33    12.76       5.039

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     25.93   Tc(MIN.) =   10.57
  TOTAL AREA(ACRES) =      8.80
  LONGEST FLOWPATH FROM NODE    162.00 TO NODE    155.00 =   933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE   1511.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   397.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.90
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     25.93
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  10.63
  LONGEST FLOWPATH FROM NODE    162.00 TO NODE   1511.00 =   973.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1511.00 TO NODE   1511.00 IS CODE =  11
------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================
```

```
 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1       25.93     10.63        5.670         8.80
 LONGEST FLOWPATH FROM NODE    162.00 TO NODE   1511.00 =   973.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1       19.85     11.93        5.261         6.50
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE   1511.00 =  1633.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
     1      43.61       10.63         5.670
     2      43.91       11.93         5.261

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     43.91   Tc(MIN.) =   11.93
 TOTAL AREA(ACRES) =     15.30

****************************************************************************
 FLOW PROCESS FROM NODE   1511.00 TO NODE   1511.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1511.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   397.00  DOWNSTREAM(FEET) =   376.00
 FLOW LENGTH(FEET) =   374.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.21
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     43.91
 PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =  12.28
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    140.00 =  2007.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1       43.91     12.28        5.166        15.30
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    140.00 =  2007.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1       34.29     11.82        5.293        13.50
 LONGEST FLOWPATH FROM NODE    108.00 TO NODE    140.00 =  2227.60 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
     1      76.58       11.82         5.293
     2      77.38       12.28         5.166
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     77.38   Tc(MIN.) =   12.28
 TOTAL AREA(ACRES) =     28.80

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF     Tc       INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1       77.38    12.28        5.166       28.80
 LONGEST FLOWPATH FROM NODE    108.00 TO NODE    140.00 =  2227.60 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF     Tc       INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1       12.88     9.56        6.070        3.70
 LONGEST FLOWPATH FROM NODE   1431.00 TO NODE    140.00 =   739.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1      73.15       9.56         6.070
    2      88.34      12.28         5.166

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     88.34   Tc(MIN.) =   12.28
 TOTAL AREA(ACRES) =     32.50

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    173.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   376.00  DOWNSTREAM(FEET) =   368.00
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  28.23
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     88.34
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =  12.32
 LONGEST FLOWPATH FROM NODE    108.00 TO NODE    173.00 =  2297.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    173.00 TO NODE    173.00 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.) =  12.32
 RAINFALL INTENSITY(INCH/HR) =   5.16
```

```
 TOTAL STREAM AREA(ACRES) =    32.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     88.34

****************************************************************************
 FLOW PROCESS FROM NODE    115.10 TO NODE    115.10 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  14.46   RAIN INTENSITY(INCH/HOUR) =  4.65
 TOTAL AREA(ACRES) =   107.40   TOTAL RUNOFF(CFS) =    187.57

+--------------------------------------------------------------------------+
| DATA PER BASIN 100.1 HYDROLOGY                                           |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    115.10 TO NODE    173.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    368.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   386.00   CHANNEL SLOPE =  0.1088
 CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.552
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    189.08
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.46
 AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   0.48
 Tc(MIN.) =  14.94
 SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    3.03
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.375
 TOTAL AREA(ACRES) =    109.30         PEAK FLOW RATE(CFS) =     187.57

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =  13.45
 LONGEST FLOWPATH FROM NODE    162.00 TO NODE    173.00 =  1319.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    173.00 TO NODE    173.00 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.) =  14.94
 RAINFALL INTENSITY(INCH/HR) =   4.55
 TOTAL STREAM AREA(ACRES) =   109.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    187.57

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        88.34     12.32         5.155         32.50
     2       187.57     14.94         4.552        109.30

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
```

```
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1       243.01     12.32        5.155
      2       265.57     14.94        4.552

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    265.57   Tc(MIN.) =   14.94
  TOTAL AREA(ACRES) =    141.80
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    173.00 =  2297.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    169.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    368.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   380.00   CHANNEL SLOPE =  0.0368
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.427
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    267.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.57
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   0.66
  Tc(MIN.) =  15.60
  SUBAREA AREA(ACRES) =     2.10       SUBAREA RUNOFF(CFS) =    3.25
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.419
  TOTAL AREA(ACRES) =    143.90         PEAK FLOW RATE(CFS) =     267.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.18   FLOW VELOCITY(FEET/SEC.) =   9.62
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    169.00 =  2677.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 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.) =  15.60
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =   143.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    267.08

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    380.00
  DOWNSTREAM ELEVATION(FEET) =    379.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.946
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    167.10 TO NODE    168.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    379.50  DOWNSTREAM(FEET) =    378.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   290.00   CHANNEL SLOPE =  0.0052
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.075
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.20
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   2.20
  Tc(MIN.) =   6.14
  SUBAREA AREA(ACRES) =     1.00       SUBAREA RUNOFF(CFS) =    6.38
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
  TOTAL AREA(ACRES) =      1.10         PEAK FLOW RATE(CFS) =       7.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   2.64
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    168.00 =   340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    169.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   354.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.02
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   6.19
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    169.00 =   400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 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.) =   6.19
  RAINFALL INTENSITY(INCH/HR) =   8.04
  TOTAL STREAM AREA(ACRES) =     1.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.02

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      267.08    15.60        4.427        143.90
      2        7.02     6.19        8.037          1.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      154.12     6.19       8.037
      2      270.94    15.60       4.427

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
 PEAK FLOW RATE(CFS) =    270.94   Tc(MIN.) =   15.60
 TOTAL AREA(ACRES) =    145.00
 LONGEST FLOWPATH FROM NODE    108.00 TO NODE    169.00 =  2677.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    342.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   315.00   CHANNEL SLOPE =  0.0381
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.331
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    273.37
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.77
 AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   0.54
 Tc(MIN.) =  16.14
 SUBAREA AREA(ACRES) =     3.20       SUBAREA RUNOFF(CFS) =    4.85
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.421
 TOTAL AREA(ACRES) =    148.20         PEAK FLOW RATE(CFS) =     270.94

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.18   FLOW VELOCITY(FEET/SEC.) =   9.76
 LONGEST FLOWPATH FROM NODE    108.00 TO NODE    170.00 =  2992.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    174.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   342.00  DOWNSTREAM(FEET) =   325.00
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  28.16
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    270.94
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =  16.27
 LONGEST FLOWPATH FROM NODE    108.00 TO NODE    174.00 =  3222.60 FEET.

+--------------------------------------------------------------------------+
| RUNOFF ENTERS EXISTING 5'X8' RCP CULVERT                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =    148.20  TC(MIN.) =     16.27
 PEAK FLOW RATE(CFS)   =    270.94
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

SECTION 6B:
BYPASS BASIN 400

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2004 Advanced Engineering Software (aes)
              Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                              Analysis prepared by:

                                LANDMARK CONSULTING
                            9555 GENESEE AVENUE, SUITE 200
                                SAN DEIGO, CA 92121
                                 TEL:  858-587-8070

 ************************** DESCRIPTION OF STUDY **************************
* CAMPUS PARK, BASIN 400, BYPASS FLOW                                     *
* POST-DEVELOPMENT CONDITIONS                                             *
* 100-YEAR STORM                                                          *
 *************************************************************************

  FILE NAME: 614P4C.DAT
  TIME/DATE OF STUDY: 12:41 02/28/2009
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ======= ===== =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE   5007.00 TO NODE   5007.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.71   RAIN INTENSITY(INCH/HOUR) =  5.64
  TOTAL AREA(ACRES) =    47.50   TOTAL RUNOFF(CFS) =     93.82
```

```
+----------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM CALCULATOINS                                  |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE   5007.00 TO NODE    401.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    590.00  DOWNSTREAM(FEET) =    581.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    73.00   CHANNEL SLOPE =  0.1233
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.599
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     93.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.49
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.13
  Tc(MIN.) =  10.84
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.20
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     47.60         PEAK FLOW RATE(CFS) =      93.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   9.48
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    401.00 =    73.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =  10.84
  RAINFALL INTENSITY(INCH/HR) =   5.60
  TOTAL STREAM AREA(ACRES) =    47.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     93.82

**************************************************************************
  FLOW PROCESS FROM NODE   6006.00 TO NODE   6006.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   9.53   RAIN INTENSITY(INCH/HOUR) =  6.08
  TOTAL AREA(ACRES) =    18.00   TOTAL RUNOFF(CFS) =     66.30

+----------------------------------------------------------------------+
| FLOW DATA PE RUPSTREAM CALCULATIONS                                  |
|                                                                      |
```

```
|                                                                              |
+------------------------------------------------------------------------------+

******************************************************************************
  FLOW PROCESS FROM NODE    6006.00 TO NODE     401.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     590.00  DOWNSTREAM(FEET) =     581.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =     73.00   CHANNEL SLOPE =  0.1233
  CHANNEL BASE(FEET) =    20.00   "Z" FACTOR =    5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =    2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.024
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     66.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.38
  AVERAGE FLOW DEPTH(FEET) =   0.36   TRAVEL TIME(MIN.) =   0.15
  Tc(MIN.) =   9.68
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.21
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.604
  TOTAL AREA(ACRES) =     18.10         PEAK FLOW RATE(CFS) =      66.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   8.36
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    401.00 =    73.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =   9.68
  RAINFALL INTENSITY(INCH/HR) =   6.02
  TOTAL STREAM AREA(ACRES) =    18.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     66.30

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       93.82    10.84        5.599        47.60
      2       66.30     9.68        6.024        18.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      150.05     9.68        6.024
      2      155.44    10.84        5.599
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    155.44   Tc(MIN.) =   10.84
 TOTAL AREA(ACRES) =     65.70
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    401.00 =    73.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    581.00  DOWNSTREAM(FEET) =    466.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   964.00   CHANNEL SLOPE =  0.1193
 CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.214
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    159.09
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.69
 AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   1.27
 Tc(MIN.) =  12.10
 SUBAREA AREA(ACRES) =     4.00       SUBAREA RUNOFF(CFS) =    7.30
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.416
 TOTAL AREA(ACRES) =     69.70         PEAK FLOW RATE(CFS) =     155.44

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =  12.58
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    402.00 =  1037.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 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.) =  12.10
 RAINFALL INTENSITY(INCH/HR) =   5.21
 TOTAL STREAM AREA(ACRES) =    69.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    155.44

****************************************************************************
 FLOW PROCESS FROM NODE   4003.00 TO NODE   4003.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  10.64   RAIN INTENSITY(INCH/HOUR) =  5.67
 TOTAL AREA(ACRES) =     9.80   TOTAL RUNOFF(CFS) =     21.22

+----------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM CALCULATION                                         |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   4003.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    620.00  DOWNSTREAM(FEET) =    466.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1327.00   CHANNEL SLOPE =  0.1161
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.500
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.723
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     32.48
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.38
 AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   3.47
 Tc(MIN.) =  14.11
 SUBAREA AREA(ACRES) =    13.50       SUBAREA RUNOFF(CFS) =   22.32
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.364
 TOTAL AREA(ACRES) =     23.30         PEAK FLOW RATE(CFS) =      40.01

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   6.97
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    402.00 =  1400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 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.) =  14.11
 RAINFALL INTENSITY(INCH/HR) =   4.72
 TOTAL STREAM AREA(ACRES) =    23.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.01

****************************************************************************
 FLOW PROCESS FROM NODE    403.00 TO NODE    403.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    889.10
 DOWNSTREAM ELEVATION(FEET) =    860.00
 ELEVATION DIFFERENCE(FEET) =     29.10
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.945
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.247
 SUBAREA RUNOFF(CFS) =      0.29
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    403.10 TO NODE    404.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    534.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   378.00   CHANNEL SLOPE =  0.8624
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   8.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.640
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.72
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.41
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.75
 Tc(MIN.) =   6.69
 SUBAREA AREA(ACRES) =     9.30       SUBAREA RUNOFF(CFS) =   24.87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      9.40        PEAK FLOW RATE(CFS) =      25.13

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =  10.78
 LONGEST FLOWPATH FROM NODE    403.00 TO NODE    404.00 =   468.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    404.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    534.00  DOWNSTREAM(FEET) =    446.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.1266
 CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.202
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     28.79
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  18.05
 AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   0.64
 Tc(MIN.) =   7.34
 SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    7.31
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     12.30        PEAK FLOW RATE(CFS) =      31.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =  18.43
 LONGEST FLOWPATH FROM NODE    403.00 TO NODE    402.00 =  1163.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 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.) =   7.34
  RAINFALL INTENSITY(INCH/HR) =   7.20
  TOTAL STREAM AREA(ACRES) =    12.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      155.44    12.10        5.214         69.70
      2       40.01    14.11        4.723         23.30
      3       31.00     7.34        7.202         12.30

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      164.34     7.34       7.202
      2      212.21    12.10       5.214
      3      201.16    14.11       4.723

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    212.21   Tc(MIN.) =   12.10
  TOTAL AREA(ACRES) =    105.30
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    402.00 =  1400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   463.00  DOWNSTREAM(FEET) =   432.70
  FLOW LENGTH(FEET) =   540.98   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.69
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    212.21
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =  12.44
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    405.00 =  1940.98 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.30  DOWNSTREAM(FEET) =   399.81
  FLOW LENGTH(FEET) =   580.25   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.69
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    212.21
```

```
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =  12.80
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    406.00 =  2521.23 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   399.41  DOWNSTREAM(FEET) =   323.20
 FLOW LENGTH(FEET) =  1455.38   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.87
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    212.21
 PIPE TRAVEL TIME(MIN.) =   0.94    Tc(MIN.) =  13.74
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    407.00 =  3976.61 FEET.

+--------------------------------------------------------------------------+
| FLOW ENTERS EXISTING DRAINAGE CHANNEL                                    |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =    105.30  TC(MIN.) =     13.74
 PEAK FLOW RATE(CFS)    =    212.21
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

SECTION 6C:
BASIN 200

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2004 Advanced Engineering Software (aes)
              Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                              Analysis prepared by:

                                LANDMARK CONSULTING
                           9555 GENESEE AVENUE, SUITE 200
                                SAN DEIGO, CA 92121
                                 TEL:  858-587-8070

 ************************** DESCRIPTION OF STUDY **************************
* CAMPUS PARK                                                             *
* PIPE SIZE WITH BASIN 12000 ADDED UPSTREAM                               *
* BASIN 200 POST-DEV. 100-YEAR STORM                                      *
 *************************************************************************

  FILE NAME: 614P2CA.DAT
  TIME/DATE OF STUDY: 16:04 05/06/2009
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.10 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    495.00
  DOWNSTREAM ELEVATION(FEET) =    494.40
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.971
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.442
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

**************************************************************************
  FLOW PROCESS FROM NODE    206.10 TO NODE    207.00 IS CODE =  62
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  494.40  DOWNSTREAM ELEVATION(FEET) =  491.00
  STREET LENGTH(FEET) =   106.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.92
  STREET FLOW TRAVEL TIME(MIN.) =   0.52   Tc(MIN.) =   7.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.106
  RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    3.41
  TOTAL AREA(ACRES) =      0.90        PEAK FLOW RATE(CFS) =       3.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.34
  FLOW VELOCITY(FEET/SEC.) =  3.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    207.00 =   166.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  491.00  DOWNSTREAM ELEVATION(FEET) =  468.20
  STREET LENGTH(FEET) =   634.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       7.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.78
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   9.71
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.012
  RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
```

```
 SUBAREA AREA(ACRES) =     2.20      SUBAREA RUNOFF(CFS) =     7.94
 TOTAL AREA(ACRES) =      3.10        PEAK FLOW RATE(CFS) =      11.18

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.22
 FLOW VELOCITY(FEET/SEC.) =  5.23   DEPTH*VELOCITY(FT*FT/SEC.) =   2.15
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    208.00 =   800.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    224.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   463.20  DOWNSTREAM(FEET) =   441.00
 FLOW LENGTH(FEET) =   691.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.18
 PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =  10.78
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    224.00 =  1491.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    218.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    502.00
 DOWNSTREAM ELEVATION(FEET) =    501.40
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.971
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.442
 SUBAREA RUNOFF(CFS) =      0.89
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.89

****************************************************************************
 FLOW PROCESS FROM NODE    218.10 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.40  DOWNSTREAM ELEVATION(FEET) =  499.30
 STREET LENGTH(FEET) =   213.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =      1.87
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    8.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =   8.66
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.468
  RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.94
  TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       2.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.36
  FLOW VELOCITY(FEET/SEC.) =  2.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    219.00 =   273.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    220.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       5.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   3.17   Tc(MIN.) =  11.83
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.291
  RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    5.71
  TOTAL AREA(ACRES) =      2.50        PEAK FLOW RATE(CFS) =       7.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.78
  FLOW VELOCITY(FEET/SEC.) =  3.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    220.00 =   873.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  447.60
  STREET LENGTH(FEET) =   459.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
```

```
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       9.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.41
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =  12.91
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.001
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.645
  SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     2.18
  TOTAL AREA(ACRES) =      3.00        PEAK FLOW RATE(CFS) =       9.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.07
  FLOW VELOCITY(FEET/SEC.) =  7.20   DEPTH*VELOCITY(FT*FT/SEC.) =   2.50
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    215.00 =  1332.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 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.) =  12.91
  RAINFALL INTENSITY(INCH/HR) =   5.00
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.68

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    469.70
  DOWNSTREAM ELEVATION(FEET) =    469.10
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.82

****************************************************************************
  FLOW PROCESS FROM NODE    209.10 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.10  DOWNSTREAM ELEVATION(FEET) =  466.90
  STREET LENGTH(FEET) =   176.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
```

```
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       2.38
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    9.29
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
 STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   8.60
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.499
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.594
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    3.12
 TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       3.86

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.42
 FLOW VELOCITY(FEET/SEC.) =  2.71   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    209.00 TO NODE    210.00 =   236.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  466.90  DOWNSTREAM ELEVATION(FEET) =  447.20
 STREET LENGTH(FEET) =   572.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       9.73
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.40
   HALFSTREET FLOOD WIDTH(FEET) =   13.61
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.94
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.97
 STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =  10.53
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.704
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.575
 SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =   11.70
 TOTAL AREA(ACRES) =      4.60        PEAK FLOW RATE(CFS) =      15.09

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.20
 FLOW VELOCITY(FEET/SEC.) =  5.50   DEPTH*VELOCITY(FT*FT/SEC.) =   2.48
 LONGEST FLOWPATH FROM NODE    209.00 TO NODE    215.00 =   808.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 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.) =  10.53
 RAINFALL INTENSITY(INCH/HR) =   5.70
 TOTAL STREAM AREA(ACRES) =     4.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.09

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         9.68    12.91        5.001          3.00
    2        15.09    10.53        5.704          4.60

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        22.98    10.53        5.704
    2        22.91    12.91        5.001

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     22.98   Tc(MIN.) =   10.53
 TOTAL AREA(ACRES) =      7.60
 LONGEST FLOWPATH FROM NODE    218.00 TO NODE    215.00 =  1332.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    224.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   440.60  DOWNSTREAM(FEET) =   440.10
 FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.50
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     22.98
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  10.61
 LONGEST FLOWPATH FROM NODE    218.00 TO NODE    224.00 =  1374.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    222.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    470.80
 DOWNSTREAM ELEVATION(FEET) =    470.20
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.971
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.442
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    222.10 TO NODE    223.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  470.20  DOWNSTREAM ELEVATION(FEET) =  467.00
  STREET LENGTH(FEET) =   208.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   8.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.554
  RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =    1.57
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.17
  FLOW VELOCITY(FEET/SEC.) =  2.50   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  LONGEST FLOWPATH FROM NODE    222.00 TO NODE    223.00 =   268.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  467.00  DOWNSTREAM ELEVATION(FEET) =  446.00
  STREET LENGTH(FEET) =   651.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       4.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.38
  STREET FLOW TRAVEL TIME(MIN.) =   2.63   Tc(MIN.) =  11.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.506
  RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
```

```
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =     1.80     SUBAREA RUNOFF(CFS) =     5.95
 TOTAL AREA(ACRES) =      2.30      PEAK FLOW RATE(CFS) =       7.60

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.44
 FLOW VELOCITY(FEET/SEC.) =  4.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
 LONGEST FLOWPATH FROM NODE    222.00 TO NODE    224.00 =   919.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1         7.60     11.12        5.506        2.30
 LONGEST FLOWPATH FROM NODE    222.00 TO NODE    224.00 =   919.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        11.18     10.78        5.617        3.10
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    224.00 =  1491.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
    1       18.55       10.78        5.617
    2       18.56       11.12        5.506

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     18.56   Tc(MIN.) =   11.12
 TOTAL AREA(ACRES) =      5.40

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        18.56     11.12        5.506        5.40
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    224.00 =  1491.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        22.98     10.61        5.675        7.60
 LONGEST FLOWPATH FROM NODE    218.00 TO NODE    224.00 =  1374.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
    1       40.70       10.61        5.675
    2       40.86       11.12        5.506

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     40.86   Tc(MIN.) =   11.12
 TOTAL AREA(ACRES) =     13.00

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

```
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    225.00 TO NODE    225.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    455.50
 DOWNSTREAM ELEVATION(FEET) =    449.40
 ELEVATION DIFFERENCE(FEET) =      6.10
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.090
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      1.11
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.11

****************************************************************************
 FLOW PROCESS FROM NODE    225.10 TO NODE    226.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  449.40  DOWNSTREAM ELEVATION(FEET) =  446.40
 STREET LENGTH(FEET) =   162.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.04
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.49
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.98
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
 STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =   4.99
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    3.87
 TOTAL AREA(ACRES) =      0.90        PEAK FLOW RATE(CFS) =       4.98

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.73
 FLOW VELOCITY(FEET/SEC.) =  3.33   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    226.00 =   242.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   440.10  DOWNSTREAM(FEET) =   420.00
 FLOW LENGTH(FEET) =   307.70   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.18
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.98
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   5.45
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    221.00 =   549.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 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) =  449.00  DOWNSTREAM ELEVATION(FEET) =  430.00
 STREET LENGTH(FEET) =   448.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       9.28
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.79
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.29
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.02
 STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =   6.87
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.516
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    8.57
 TOTAL AREA(ACRES) =      2.80        PEAK FLOW RATE(CFS) =      12.63

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.47
 FLOW VELOCITY(FEET/SEC.) =  5.71   DEPTH*VELOCITY(FT*FT/SEC.) =   2.37
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =   997.70 FEET.

****************************************************************************
 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.) =    6.87
 RAINFALL INTENSITY(INCH/HR) =    7.52
 TOTAL STREAM AREA(ACRES) =      2.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.63

****************************************************************************
 FLOW PROCESS FROM NODE    228.00 TO NODE    228.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    457.30
 DOWNSTREAM ELEVATION(FEET) =    456.70
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.971
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.442
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE    228.10 TO NODE    229.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  456.70  DOWNSTREAM ELEVATION(FEET) =  449.00
 STREET LENGTH(FEET) =   156.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.08
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    4.26
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.59
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
 STREET FLOW TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =   7.70
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.982
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.26
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.68

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.63
 FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
 LONGEST FLOWPATH FROM NODE    228.00 TO NODE    229.00 =   216.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    229.00 TO NODE    227.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  449.00  DOWNSTREAM ELEVATION(FEET) =  430.00
 STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.10
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.88
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.52
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =   9.25
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.203
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    4.84
 TOTAL AREA(ACRES) =      1.70        PEAK FLOW RATE(CFS) =       6.33

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.76
 FLOW VELOCITY(FEET/SEC.) =  4.96   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
 LONGEST FLOWPATH FROM NODE    228.00 TO NODE    227.00 =   636.00 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.) =   9.25
 RAINFALL INTENSITY(INCH/HR) =   6.20
 TOTAL STREAM AREA(ACRES) =     1.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.33

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       12.63     6.87        7.516          2.80
    2        6.33     9.25        6.203          1.70

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       17.32     6.87        7.516
    2       16.75     9.25        6.203

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     17.32   Tc(MIN.) =    6.87
 TOTAL AREA(ACRES) =      4.50
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =   997.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    227.00 TO NODE    221.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   424.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     17.32
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   6.92
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    221.00 =  1053.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1       17.32      6.92        7.475         4.50
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    221.00 =  1053.70 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        4.98      5.45        8.720         0.90
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    221.00 =   549.70 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
     1      18.62       5.45        8.720
     2      21.59       6.92        7.475

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     21.59   Tc(MIN.) =     6.92
  TOTAL AREA(ACRES) =      5.40

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   392.00
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     21.59
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   7.36
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    230.00 =  1478.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.186
```

```
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6422
  SUBAREA AREA(ACRES) =     1.00   SUBAREA RUNOFF(CFS) =     6.25
  TOTAL AREA(ACRES) =       6.40   TOTAL RUNOFF(CFS) =    29.53
  TC(MIN.) =   7.36

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   362.00
  FLOW LENGTH(FEET) =   303.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     29.53
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   7.61
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    231.00 =  1781.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    232.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    414.70
  DOWNSTREAM ELEVATION(FEET) =    407.70
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.608
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    232.10 TO NODE    233.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.70  DOWNSTREAM ELEVATION(FEET) =  397.00
  STREET LENGTH(FEET) =    92.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.20
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.19
    HALFSTREET FLOOD WIDTH(FEET) =    3.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =   1.89
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.80
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       1.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.15
  FLOW VELOCITY(FEET/SEC.) =  5.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE    232.00 TO NODE    233.00 =   162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    234.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  397.00  DOWNSTREAM ELEVATION(FEET) =  367.00
  STREET LENGTH(FEET) =   699.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       8.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.93
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =   4.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =   13.64
  TOTAL AREA(ACRES) =      1.90        PEAK FLOW RATE(CFS) =      15.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.54
  FLOW VELOCITY(FEET/SEC.) =  6.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.63
  LONGEST FLOWPATH FROM NODE    232.00 TO NODE    234.00 =   861.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    234.00 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.) =   4.12
```

```
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     1.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.24

****************************************************************************
 FLOW PROCESS FROM NODE    235.00 TO NODE    235.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    398.00
 DOWNSTREAM ELEVATION(FEET) =    390.00
 ELEVATION DIFFERENCE(FEET) =      8.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.896
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    235.10 TO NODE    234.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  390.00  DOWNSTREAM ELEVATION(FEET) =  367.00
 STREET LENGTH(FEET) =   262.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.56
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.81
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.61
 STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =   2.65
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    6.42
 TOTAL AREA(ACRES) =      0.90        PEAK FLOW RATE(CFS) =       7.22

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.85
 FLOW VELOCITY(FEET/SEC.) =  6.63   DEPTH*VELOCITY(FT*FT/SEC.) =   2.14
 LONGEST FLOWPATH FROM NODE    235.00 TO NODE    234.00 =   352.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    234.00 TO NODE    234.00 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.) =   2.65
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     0.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.22

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       15.24     4.12        9.222          1.90
    2        7.22     2.65        9.222          0.90

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       17.00     2.65       9.222
    2       22.46     4.12       9.222

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     22.46   Tc(MIN.) =    4.12
 TOTAL AREA(ACRES) =      2.80
 LONGEST FLOWPATH FROM NODE    232.00 TO NODE    234.00 =   861.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    234.00 TO NODE    231.00 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) =    28.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     22.46
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   4.17
 LONGEST FLOWPATH FROM NODE    232.00 TO NODE    231.00 =   889.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       22.46     4.17        9.222        2.80
 LONGEST FLOWPATH FROM NODE    232.00 TO NODE    231.00 =   889.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       29.53     7.61        7.033        6.40
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    231.00 =  1781.70 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1       38.65       4.17        9.222
    2       46.67       7.61        7.033

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     46.67   Tc(MIN.) =    7.61
```

```
 TOTAL AREA(ACRES) =      9.20

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 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) =   362.00  DOWNSTREAM(FEET) =   346.00
 FLOW LENGTH(FEET) =   338.60   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.54
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     46.67
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   7.93
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    236.00 =  2120.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   7.93
 RAINFALL INTENSITY(INCH/HR) =   6.85
 TOTAL STREAM AREA(ACRES) =     9.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     46.67

****************************************************************************
 FLOW PROCESS FROM NODE    237.00 TO NODE    237.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    397.90
 DOWNSTREAM ELEVATION(FEET) =    394.40
 ELEVATION DIFFERENCE(FEET) =      3.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.264
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    237.10 TO NODE    238.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  394.40  DOWNSTREAM ELEVATION(FEET) =  365.00
 STREET LENGTH(FEET) =   672.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   2.66   Tc(MIN.) =   4.92
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =     4.81
  TOTAL AREA(ACRES) =       0.70        PEAK FLOW RATE(CFS) =       5.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.31
  FLOW VELOCITY(FEET/SEC.) =  4.76   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    237.00 TO NODE    238.00 =   752.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  365.00  DOWNSTREAM ELEVATION(FEET) =  354.00
  STREET LENGTH(FEET) =   302.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       7.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.78
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =   5.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.226
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =     4.29
  TOTAL AREA(ACRES) =       1.30        PEAK FLOW RATE(CFS) =       9.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.20
  FLOW VELOCITY(FEET/SEC.) =  5.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE    237.00 TO NODE    236.00 =  1054.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==========================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   5.97
  RAINFALL INTENSITY(INCH/HR) =   8.23
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.30

**************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.10 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    380.00
  DOWNSTREAM ELEVATION(FEET) =    379.40
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.486
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.78

**************************************************************************
  FLOW PROCESS FROM NODE    239.10 TO NODE    240.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    379.40  DOWNSTREAM(FEET) =    378.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   134.00   CHANNEL SLOPE =  0.0104
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  96
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      9.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.11
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   0.54
  Tc(MIN.) =   4.03
  SUBAREA AREA(ACRES) =     2.10       SUBAREA RUNOFF(CFS) =   16.46
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  TOTAL AREA(ACRES) =      2.20         PEAK FLOW RATE(CFS) =      17.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOW VELOCITY(FEET/SEC.) =   4.85
  LONGEST FLOWPATH FROM NODE    239.00 TO NODE    240.00 =   194.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    240.00 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) =   372.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =   124.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     17.24
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   4.11
  LONGEST FLOWPATH FROM NODE    239.00 TO NODE    236.00 =   318.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    4.11
 RAINFALL INTENSITY(INCH/HR) =    9.22
 TOTAL STREAM AREA(ACRES) =     2.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.24

****************************************************************************
 FLOW PROCESS FROM NODE    241.00 TO NODE    241.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    386.40
 DOWNSTREAM ELEVATION(FEET) =    386.00
 ELEVATION DIFFERENCE(FEET) =      0.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.153
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    241.10 TO NODE    242.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  386.00  DOWNSTREAM ELEVATION(FEET) =  380.00
 STREET LENGTH(FEET) =   663.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       2.27
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.80
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
 STREET FLOW TRAVEL TIME(MIN.) =   5.25   Tc(MIN.) =   8.41
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.595
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    2.87
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       3.44

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.68
 FLOW VELOCITY(FEET/SEC.) =  2.32   DEPTH*VELOCITY(FT*FT/SEC.) =   0.84
```

```
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    242.00 =   713.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  380.00  DOWNSTREAM ELEVATION(FEET) =  354.00
 STREET LENGTH(FEET) =  1526.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       6.95
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.40
   HALFSTREET FLOOD WIDTH(FEET) =   13.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.51
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
 STREET FLOW TRAVEL TIME(MIN.) =   7.26   Tc(MIN.) =  15.66
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.415
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    6.91
 TOTAL AREA(ACRES) =      2.40        PEAK FLOW RATE(CFS) =       9.22

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.28
 FLOW VELOCITY(FEET/SEC.) =  3.76   DEPTH*VELOCITY(FT*FT/SEC.) =   1.62
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    236.00 =  2239.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
 TIME OF CONCENTRATION(MIN.) =  15.66
 RAINFALL INTENSITY(INCH/HR) =   4.41
 TOTAL STREAM AREA(ACRES) =     2.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.22

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       46.67     7.93        6.847          9.20
     2        9.30     5.97        8.226          1.30
     3       17.24     4.11        9.222          2.20
     4        9.22    15.66        4.415          2.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  4 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
```

```
      1       50.28     4.11       9.222
      2       63.31     5.97       8.226
      3       71.88     7.93       6.847
      4       52.56    15.66       4.415

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     71.88   Tc(MIN.) =    7.93
  TOTAL AREA(ACRES) =     15.10
  LONGEST FLOWPATH FROM NODE    241.00 TO NODE    236.00 =  2239.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    243.00 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) =   341.00
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.71
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     71.88
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   8.55
  LONGEST FLOWPATH FROM NODE    241.00 TO NODE    243.00 =  2639.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    243.00 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.) =   8.55
  RAINFALL INTENSITY(INCH/HR) =   6.52
  TOTAL STREAM AREA(ACRES) =    15.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     71.88

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    244.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    386.40
  DOWNSTREAM ELEVATION(FEET) =    386.00
  ELEVATION DIFFERENCE(FEET) =      0.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.153
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    244.10 TO NODE    245.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  386.00  DOWNSTREAM ELEVATION(FEET) =  380.00
  STREET LENGTH(FEET) =   663.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  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) =       2.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   5.25   Tc(MIN.) =   8.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.595
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    2.87
  TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.68
  FLOW VELOCITY(FEET/SEC.) =  2.32   DEPTH*VELOCITY(FT*FT/SEC.) =   0.84
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    245.00 =   713.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    243.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  380.00  DOWNSTREAM ELEVATION(FEET) =  351.00
  STREET LENGTH(FEET) =  1842.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       6.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.35
  STREET FLOW TRAVEL TIME(MIN.) =   9.12   Tc(MIN.) =  17.53
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.106
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    6.43
  TOTAL AREA(ACRES) =      2.40        PEAK FLOW RATE(CFS) =       8.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.08
  FLOW VELOCITY(FEET/SEC.) =  3.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    243.00 =  2555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    243.00 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.) =  17.53
  RAINFALL INTENSITY(INCH/HR) =   4.11
  TOTAL STREAM AREA(ACRES) =     2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.57

********************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    246.10 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    447.20
  DOWNSTREAM ELEVATION(FEET) =    440.70
  ELEVATION DIFFERENCE(FEET) =      6.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.032
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

********************************************************************************
  FLOW PROCESS FROM NODE    246.10 TO NODE    247.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  440.70  DOWNSTREAM ELEVATION(FEET) =  424.00
  STREET LENGTH(FEET) =   233.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =   2.86
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    2.41
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       3.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.16
  FLOW VELOCITY(FEET/SEC.) =  5.09   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    246.00 TO NODE    247.00 =   323.00 FEET.

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

```
 FLOW PROCESS FROM NODE    247.00 TO NODE    248.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  424.00  DOWNSTREAM ELEVATION(FEET) =  353.00
 STREET LENGTH(FEET) =  1117.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       7.88
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   10.97
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.06
 STREET FLOW TRAVEL TIME(MIN.) =   3.12   Tc(MIN.) =   5.99
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.211
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    9.29
 TOTAL AREA(ACRES) =      1.70        PEAK FLOW RATE(CFS) =      12.14

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.10
 FLOW VELOCITY(FEET/SEC.) =  6.62   DEPTH*VELOCITY(FT*FT/SEC.) =   2.57
 LONGEST FLOWPATH FROM NODE    246.00 TO NODE    248.00 =  1440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    248.00 TO NODE    249.00 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) =   252.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =      13.71
   ***STREET FLOW SPLITS OVER STREET-CROWN***
   FULL DEPTH(FEET) =    0.49   FLOOD WIDTH(FEET) =   18.00
   FULL HALF-STREET VELOCITY(FEET/SEC.) =    3.16
   SPLIT DEPTH(FEET) =    0.35   SPLIT FLOOD WIDTH(FEET) =   10.97
   SPLIT FLOW(CFS) =    3.10   SPLIT VELOCITY(FEET/SEC.) =    2.35
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.49
   HALFSTREET FLOOD WIDTH(FEET) =   18.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.16
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.54
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   1.33   Tc(MIN.) =   7.31
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.215
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    3.14
 TOTAL AREA(ACRES) =      2.20        PEAK FLOW RATE(CFS) =      13.81

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.00
 FLOW VELOCITY(FEET/SEC.) =  3.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
 LONGEST FLOWPATH FROM NODE    246.00 TO NODE    249.00 =  1692.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    249.00 TO NODE    243.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   344.00  DOWNSTREAM(FEET) =   341.00
 FLOW LENGTH(FEET) =    79.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.93
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.81
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   7.42
 LONGEST FLOWPATH FROM NODE    246.00 TO NODE    243.00 =  1771.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    243.00 TO NODE    243.00 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.) =   7.42
 RAINFALL INTENSITY(INCH/HR) =   7.15
 TOTAL STREAM AREA(ACRES) =     2.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.81

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       71.88     8.55        6.522         15.10
    2        8.57    17.53        4.106          2.40
    3       13.81     7.42        7.146          2.20

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       83.05     7.42        7.146
    2       88.67     8.55        6.522
    3       61.76    17.53        4.106

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     88.67   Tc(MIN.) =    8.55
 TOTAL AREA(ACRES) =     19.70
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    243.00 =  2639.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    243.00 TO NODE    250.00 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) =   339.00
  FLOW LENGTH(FEET) =   389.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.81
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     88.67
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   9.29
  LONGEST FLOWPATH FROM NODE    241.00 TO NODE    250.00 =  3028.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    251.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    373.00
  DOWNSTREAM ELEVATION(FEET) =    372.10
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.045
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE    251.10 TO NODE    252.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    272.10  DOWNSTREAM(FEET) =    271.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    79.00   CHANNEL SLOPE =  0.0139
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  96
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.20
  AVERAGE FLOW DEPTH(FEET) =   0.43   TRAVEL TIME(MIN.) =   0.31
  Tc(MIN.) =   3.36
  SUBAREA AREA(ACRES) =     1.40       SUBAREA RUNOFF(CFS) =   10.97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  TOTAL AREA(ACRES) =      1.50         PEAK FLOW RATE(CFS) =      11.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   4.92
  LONGEST FLOWPATH FROM NODE    251.00 TO NODE    252.00 =   139.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    253.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    363.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00   CHANNEL SLOPE =  0.0123
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   8.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.756
 OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  96
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     34.41
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.41
 AVERAGE FLOW DEPTH(FEET) =   0.66   TRAVEL TIME(MIN.) =   3.18
 Tc(MIN.) =   6.54
 SUBAREA AREA(ACRES) =     6.80       SUBAREA RUNOFF(CFS) =   44.83
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 TOTAL AREA(ACRES) =      8.30         PEAK FLOW RATE(CFS) =      54.72

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   3.88
 LONGEST FLOWPATH FROM NODE    251.00 TO NODE    253.00 =   789.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    253.00 TO NODE    254.00 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) =   342.00
 FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  29.60
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     54.72
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   6.59
 LONGEST FLOWPATH FROM NODE    251.00 TO NODE    254.00 =   885.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 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.) =   6.59
 RAINFALL INTENSITY(INCH/HR) =   7.71
 TOTAL STREAM AREA(ACRES) =     8.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     54.72

****************************************************************************
 FLOW PROCESS FROM NODE   2541.00 TO NODE   2541.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    351.00
 DOWNSTREAM ELEVATION(FEET) =    350.70
 ELEVATION DIFFERENCE(FEET) =      0.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.471
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE   2541.10 TO NODE    254.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
UPSTREAM ELEVATION(FEET) =  350.70  DOWNSTREAM ELEVATION(FEET) =  349.00
STREET LENGTH(FEET) =   363.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.020
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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) =       3.81
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.40
  HALFSTREET FLOOD WIDTH(FEET) =   13.91
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.86
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
STREET FLOW TRAVEL TIME(MIN.) =   3.26   Tc(MIN.) =   6.73
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.614
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  98
AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    5.96
TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       6.62

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.31
FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
LONGEST FLOWPATH FROM NODE   2541.00 TO NODE    254.00 =   413.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 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.) =   6.73
RAINFALL INTENSITY(INCH/HR) =   7.61
TOTAL STREAM AREA(ACRES) =     1.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.62

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       54.72     6.59        7.715         8.30
    2        6.62     6.73        7.614         1.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       61.21     6.59       7.715
    2       60.63     6.73       7.614

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     61.21   Tc(MIN.) =    6.59
TOTAL AREA(ACRES) =      9.30
LONGEST FLOWPATH FROM NODE    251.00 TO NODE    254.00 =   885.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    254.00 TO NODE    250.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   343.00  DOWNSTREAM(FEET) =   342.50
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.78
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     61.21
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   6.74
 LONGEST FLOWPATH FROM NODE    251.00 TO NODE    250.00 =   960.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2501.00 TO NODE   2501.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    351.00
 DOWNSTREAM ELEVATION(FEET) =    350.80
 ELEVATION DIFFERENCE(FEET) =      0.20
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
 WARNING: THE MINIMUM OVERLAND FLOW SLOPE, 0.5%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE   2501.10 TO NODE    250.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  350.80  DOWNSTREAM ELEVATION(FEET) =  349.50
 STREET LENGTH(FEET) =   363.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       2.66
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.69
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.54
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
 STREET FLOW TRAVEL TIME(MIN.) =   3.93   Tc(MIN.) =   7.62
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.029
```

```
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =     0.60     SUBAREA RUNOFF(CFS) =     3.67
 TOTAL AREA(ACRES) =      0.70      PEAK FLOW RATE(CFS) =       4.28

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.38
 FLOW VELOCITY(FEET/SEC.) =  1.72   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
 LONGEST FLOWPATH FROM NODE   2501.00 TO NODE    250.00 =   413.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1         4.28      7.62        7.029        0.70
 LONGEST FLOWPATH FROM NODE   2501.00 TO NODE    250.00 =   413.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        88.67      9.29        6.184       19.70
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    250.00 =  3028.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1      76.98        7.62        7.029
    2      92.44        9.29        6.184

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     92.44   Tc(MIN.) =     9.29
 TOTAL AREA(ACRES) =     20.40

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        92.44      9.29        6.184       20.40
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    250.00 =  3028.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        61.21      6.74        7.609        9.30
 LONGEST FLOWPATH FROM NODE    251.00 TO NODE    250.00 =   960.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1     128.22        6.74        7.609
    2     142.18        9.29        6.184

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    142.18   Tc(MIN.) =     9.29
 TOTAL AREA(ACRES) =     29.70
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    255.00 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) =   335.90
 FLOW LENGTH(FEET) =   307.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.08
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    142.18
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   9.59
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    255.00 =  3335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    255.00 TO NODE    255.00 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.) =   9.59
 RAINFALL INTENSITY(INCH/HR) =   6.06
 TOTAL STREAM AREA(ACRES) =    29.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    142.18

****************************************************************************
 FLOW PROCESS FROM NODE    256.00 TO NODE    256.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  80
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    352.60
 DOWNSTREAM ELEVATION(FEET) =    351.00
 ELEVATION DIFFERENCE(FEET) =      1.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.584
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.061
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    256.10 TO NODE    257.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    351.00  DOWNSTREAM(FEET) =    345.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   375.00   CHANNEL SLOPE =  0.0160
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.465
 LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3500
```

```
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  80
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.75
 AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   1.67
 Tc(MIN.) =  11.25
 SUBAREA AREA(ACRES) =     3.20       SUBAREA RUNOFF(CFS) =    6.12
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      3.30         PEAK FLOW RATE(CFS) =       6.31

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   4.42
 LONGEST FLOWPATH FROM NODE    256.00 TO NODE    257.00 =   455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    257.00 TO NODE    255.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   336.50  DOWNSTREAM(FEET) =   335.90
 FLOW LENGTH(FEET) =   123.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.46
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.31
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =  11.71
 LONGEST FLOWPATH FROM NODE    256.00 TO NODE    255.00 =   578.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    255.00 TO NODE    255.00 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.) =  11.71
 RAINFALL INTENSITY(INCH/HR) =   5.33
 TOTAL STREAM AREA(ACRES) =     3.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.31

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1      142.18     9.59        6.058         29.70
    2        6.31    11.71        5.326          3.30

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      147.35     9.59        6.058
    2      131.30    11.71        5.326

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    147.35   Tc(MIN.) =    9.59
 TOTAL AREA(ACRES) =     33.00
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    255.00 =  3335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    255.00 TO NODE    258.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   335.90  DOWNSTREAM(FEET) =   311.00
 FLOW LENGTH(FEET) =   785.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.89
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    147.35
 PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =  10.25
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    258.00 =  4120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    259.00 TO NODE    259.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    843.50
 DOWNSTREAM ELEVATION(FEET) =    810.00
 ELEVATION DIFFERENCE(FEET) =     33.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    259.10 TO NODE    260.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    810.00  DOWNSTREAM(FEET) =    486.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   751.00   CHANNEL SLOPE =  0.4314
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =      0.28
 FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =   8.91
 LONGEST FLOWPATH FROM NODE    259.00 TO NODE    260.00 =   851.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    259.10 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.355
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   13.10   SUBAREA RUNOFF(CFS) =   29.14
 TOTAL AREA(ACRES) =     13.20   TOTAL RUNOFF(CFS) =   29.36
 TC(MIN.) =   8.91

****************************************************************************
 FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 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.) =   8.91
 RAINFALL INTENSITY(INCH/HR) =   6.35
 TOTAL STREAM AREA(ACRES) =    13.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.36

****************************************************************************
 FLOW PROCESS FROM NODE   2601.00 TO NODE   2601.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    502.00
 DOWNSTREAM ELEVATION(FEET) =    501.40
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
 SUBAREA RUNOFF(CFS) =      0.41
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE   2601.10 TO NODE   2602.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.40  DOWNSTREAM ELEVATION(FEET) =  499.00
 STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.31
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.16
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.08
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
 STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =   8.99
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.315
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.80
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       2.16

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.99
 FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2602.00 =   260.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2602.00 TO NODE    260.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  499.00  DOWNSTREAM ELEVATION(FEET) =  483.60
 STREET LENGTH(FEET) =   807.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.75
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   11.42
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
 STREET FLOW TRAVEL TIME(MIN.) =   4.03   Tc(MIN.) =  13.03
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.972
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
 SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    5.19
 TOTAL AREA(ACRES) =      1.80        PEAK FLOW RATE(CFS) =       6.89

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.30
 FLOW VELOCITY(FEET/SEC.) =  3.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    260.00 =  1067.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 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.) =  13.03
 RAINFALL INTENSITY(INCH/HR) =   4.97
 TOTAL STREAM AREA(ACRES) =     1.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.89

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       29.36     8.91        6.355         13.20
     2        6.89    13.03        4.972          1.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       34.07     8.91        6.355
     2       29.86    13.03        4.972

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     34.07   Tc(MIN.) =    8.91
 TOTAL AREA(ACRES) =     15.00
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    260.00 =  1067.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    260.00 TO NODE    261.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.50  DOWNSTREAM(FEET) =   469.60
  FLOW LENGTH(FEET) =   352.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.22
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     34.07
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   9.39
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    261.00 =  1419.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 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.) =   9.39
  RAINFALL INTENSITY(INCH/HR) =   6.14
  TOTAL STREAM AREA(ACRES) =    15.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.07

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    262.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    487.80
  DOWNSTREAM ELEVATION(FEET) =    486.10
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.577
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    262.10 TO NODE    261.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  486.10  DOWNSTREAM ELEVATION(FEET) =  475.60
  STREET LENGTH(FEET) =   448.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =   5.22
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.969
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.56
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       2.34

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.02
 FLOW VELOCITY(FEET/SEC.) =  3.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
 LONGEST FLOWPATH FROM NODE    262.00 TO NODE    261.00 =   518.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 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.) =   5.22
 RAINFALL INTENSITY(INCH/HR) =   8.97
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.34

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       34.07     9.39        6.143         15.00
    2        2.34     5.22        8.969          0.30

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       25.68     5.22       8.969
    2       35.67     9.39       6.143

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     35.67   Tc(MIN.) =     9.39
 TOTAL AREA(ACRES) =     15.30
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    261.00 =  1419.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    261.00 TO NODE    263.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   469.00  DOWNSTREAM(FEET) =   442.20
 FLOW LENGTH(FEET) =   493.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.30
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     35.67
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   9.86
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    263.00 =  1912.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   2631.00 TO NODE   2631.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    475.30
 DOWNSTREAM ELEVATION(FEET) =    470.30
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.218
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE   2631.10 TO NODE    263.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  470.30  DOWNSTREAM ELEVATION(FEET) =  448.20
 STREET LENGTH(FEET) =   401.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.60
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.33
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.99
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
 STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =   3.89
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.60
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       2.41

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.60
 FLOW VELOCITY(FEET/SEC.) =  4.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
 LONGEST FLOWPATH FROM NODE   2631.00 TO NODE    263.00 =   491.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    264.00 TO NODE    264.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==========================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    681.00
  DOWNSTREAM ELEVATION(FEET) =    640.10
  ELEVATION DIFFERENCE(FEET) =     40.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.972
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

**************************************************************************
  FLOW PROCESS FROM NODE    264.10 TO NODE    265.00 IS CODE =  52
--------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    640.10  DOWNSTREAM(FEET) =    455.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   452.00   CHANNEL SLOPE =  0.4095
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =      0.28
  FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =   7.85
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    265.00 =   552.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    264.10 TO NODE    265.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.891
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =     1.60   SUBAREA RUNOFF(CFS) =     3.86
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =    4.10
  TC(MIN.) =   7.85

**************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 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.) =   7.85
  RAINFALL INTENSITY(INCH/HR) =   6.89
  TOTAL STREAM AREA(ACRES) =     1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.10

**************************************************************************
  FLOW PROCESS FROM NODE   9002.00 TO NODE   9002.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   8.16   RAIN INTENSITY(INCH/HOUR) =  6.72
  TOTAL AREA(ACRES) =     2.00   TOTAL RUNOFF(CFS) =      2.35

**************************************************************************
  FLOW PROCESS FROM NODE   9002.00 TO NODE    265.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   452.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.35
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.17
  LONGEST FLOWPATH FROM NODE    262.00 TO NODE    265.00 =   528.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 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.) =   8.17
  RAINFALL INTENSITY(INCH/HR) =   6.72
  TOTAL STREAM AREA(ACRES) =     2.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.35

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.10     7.85        6.891          1.70
      2        2.35     8.17        6.718          2.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.36     7.85        6.891
      2        6.35     8.17        6.718

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      6.36   Tc(MIN.) =    7.85
  TOTAL AREA(ACRES) =      3.70
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    265.00 =   552.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    263.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.00  DOWNSTREAM(FEET) =   442.20
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      6.36
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.91
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    263.00 =   605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
```

```
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1         6.36      7.91        6.862        3.70
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    263.00 =    605.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        35.67      9.86        5.951       15.30
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    263.00 =   1912.30 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1       34.96       7.91        6.862
    2       41.19       9.86        5.951

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     41.19   Tc(MIN.) =     9.86
 TOTAL AREA(ACRES) =     19.00

****************************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        41.19      9.86        5.951       19.00
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    263.00 =   1912.30 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1         2.41      3.89        9.222        0.30
 LONGEST FLOWPATH FROM NODE   2631.00 TO NODE    263.00 =    491.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1       18.67       3.89        9.222
    2       42.74       9.86        5.951

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     42.74   Tc(MIN.) =     9.86
 TOTAL AREA(ACRES) =     19.30

****************************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE   2661.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   442.20  DOWNSTREAM(FEET) =   428.00
```

```
 FLOW LENGTH(FEET) =   207.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.69
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     42.74
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =  10.04
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2661.20 =  2119.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2661.30 TO NODE   2661.30 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.) =  10.04
 RAINFALL INTENSITY(INCH/HR) =   5.88
 TOTAL STREAM AREA(ACRES) =    19.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     42.74

****************************************************************************
 FLOW PROCESS FROM NODE  10006.00 TO NODE  10006.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  11.20   RAIN INTENSITY(INCH/HOUR) =  5.48
 TOTAL AREA(ACRES) =    75.00   TOTAL RUNOFF(CFS) =    114.16

****************************************************************************
 FLOW PROCESS FROM NODE  10006.00 TO NODE   2661.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   444.00  DOWNSTREAM(FEET) =   428.00
 FLOW LENGTH(FEET) =   154.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  16.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  29.37
 GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    114.16
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  11.29
 LONGEST FLOWPATH FROM NODE    262.00 TO NODE   2661.30 =   682.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2661.30 TO NODE   2661.30 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.) =  11.29
 RAINFALL INTENSITY(INCH/HR) =   5.45
 TOTAL STREAM AREA(ACRES) =    75.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    114.16

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc      INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        42.74    10.04        5.883         19.30
     2       114.16    11.29        5.454         75.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc      INTENSITY
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       144.25     10.04       5.883
     2       153.78     11.29       5.454

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    153.78   Tc(MIN.) =   11.29
  TOTAL AREA(ACRES) =     94.30
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2661.30 =  2119.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2661.30 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   442.20  DOWNSTREAM(FEET) =   424.00
  FLOW LENGTH(FEET) =   513.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.00
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    153.78
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =  11.69
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    266.00 =  2632.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.69
  RAINFALL INTENSITY(INCH/HR) =   5.33
  TOTAL STREAM AREA(ACRES) =    94.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    153.78

****************************************************************************
  FLOW PROCESS FROM NODE   2661.00 TO NODE   2661.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    450.00
  DOWNSTREAM ELEVATION(FEET) =    446.60
  ELEVATION DIFFERENCE(FEET) =      3.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.286
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE   2661.10 TO NODE    266.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.60  DOWNSTREAM ELEVATION(FEET) =  430.00
  STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
 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) =       1.60
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.74
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.59
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
 STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =   4.10
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.60
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       2.41

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.06
 FLOW VELOCITY(FEET/SEC.) =  3.91   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
 LONGEST FLOWPATH FROM NODE   2661.00 TO NODE    266.00 =   470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   4.10
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.41

****************************************************************************
 FLOW PROCESS FROM NODE  11003.00 TO NODE  11003.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  11.19   RAIN INTENSITY(INCH/HOUR) =  5.48
 TOTAL AREA(ACRES) =    19.90   TOTAL RUNOFF(CFS) =     38.20

****************************************************************************
 FLOW PROCESS FROM NODE  11003.00 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   424.00
 FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.83
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     38.20
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  11.29
 LONGEST FLOWPATH FROM NODE    246.00 TO NODE    266.00 =  1837.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.29
  RAINFALL INTENSITY(INCH/HR) =   5.45
  TOTAL STREAM AREA(ACRES) =    19.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.20

****************************************************************************
  FLOW PROCESS FROM NODE  12003.00 TO NODE  12003.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.66   RAIN INTENSITY(INCH/HOUR) =  5.66
  TOTAL AREA(ACRES) =    25.50   TOTAL RUNOFF(CFS) =     50.50

****************************************************************************
  FLOW PROCESS FROM NODE  12003.00 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   424.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.94
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     50.50
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  10.83
  LONGEST FLOWPATH FROM NODE    241.00 TO NODE    266.00 =  2339.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =  10.83
  RAINFALL INTENSITY(INCH/HR) =   5.60
  TOTAL STREAM AREA(ACRES) =    25.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     50.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      153.78    11.69        5.331         94.30
      2        2.41     4.10        9.222          0.30
      3       38.20    11.29        5.453         19.90
      4       50.50    10.83        5.602         25.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      124.28     4.10       9.222
      2      234.92    10.83       5.602
      3      239.12    11.29       5.453
      4      240.57    11.69       5.331

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    240.57   Tc(MIN.) =   11.69
  TOTAL AREA(ACRES) =    140.00
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    266.00 =  2632.30 FEET.

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

```
 FLOW PROCESS FROM NODE    266.00 TO NODE    268.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   416.00
 FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  47.26
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    240.57
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.72
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    268.00 =  2694.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    268.00 TO NODE    269.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   416.00  DOWNSTREAM(FEET) =   380.80
 FLOW LENGTH(FEET) =   711.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  26.28
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    240.57
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =  12.17
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    269.00 =  3405.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 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.) =  12.17
 RAINFALL INTENSITY(INCH/HR) =   5.20
 TOTAL STREAM AREA(ACRES) =   140.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    240.57

****************************************************************************
 FLOW PROCESS FROM NODE    270.00 TO NODE    271.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    422.50
 DOWNSTREAM ELEVATION(FEET) =    421.50
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.087
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.364
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    270.10 TO NODE    271.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  421.50  DOWNSTREAM ELEVATION(FEET) =  420.50
 STREET LENGTH(FEET) =    58.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       0.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
  STREET FLOW TRAVEL TIME(MIN.) =   0.44   Tc(MIN.) =   7.52
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.086
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.81
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.24
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    271.00 =   128.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    271.00 TO NODE    269.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.50  DOWNSTREAM ELEVATION(FEET) =  386.80
  STREET LENGTH(FEET) =   681.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       5.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.59
  STREET FLOW TRAVEL TIME(MIN.) =   2.30   Tc(MIN.) =   9.83
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.964
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    8.16
  TOTAL AREA(ACRES) =      2.70        PEAK FLOW RATE(CFS) =       9.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.34
  FLOW VELOCITY(FEET/SEC.) =  5.60   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    269.00 =   809.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 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.) =   9.83
 RAINFALL INTENSITY(INCH/HR) =   5.96
 TOTAL STREAM AREA(ACRES) =     2.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.18

****************************************************************************
 FLOW PROCESS FROM NODE    272.00 TO NODE    272.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    423.30
 DOWNSTREAM ELEVATION(FEET) =    422.20
 ELEVATION DIFFERENCE(FEET) =      1.10
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.866
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.516
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE    272.10 TO NODE    273.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  422.20  DOWNSTREAM ELEVATION(FEET) =  420.40
 STREET LENGTH(FEET) =   113.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.23
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.45
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
 STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =   7.69
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.988
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.59
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.99

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.12
 FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
 LONGEST FLOWPATH FROM NODE    272.00 TO NODE    273.00 =   183.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    273.00 TO NODE    274.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  420.40  DOWNSTREAM ELEVATION(FEET) =  386.80
 STREET LENGTH(FEET) =   674.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       5.55
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =    9.95
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.01
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.63
 STREET FLOW TRAVEL TIME(MIN.) =   2.24   Tc(MIN.) =   9.93
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.924
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    7.09
 TOTAL AREA(ACRES) =      2.60        PEAK FLOW RATE(CFS) =       8.78

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.08
 FLOW VELOCITY(FEET/SEC.) =  5.56   DEPTH*VELOCITY(FT*FT/SEC.) =   2.05
 LONGEST FLOWPATH FROM NODE    272.00 TO NODE    274.00 =   857.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    274.00 TO NODE    269.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   380.80  DOWNSTREAM(FEET) =   380.00
 FLOW LENGTH(FEET) =    46.35   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.94
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      8.78
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  10.03
 LONGEST FLOWPATH FROM NODE    272.00 TO NODE    269.00 =   903.35 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 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.) =  10.03
 RAINFALL INTENSITY(INCH/HR) =   5.89
 TOTAL STREAM AREA(ACRES) =     2.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.78

 ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       240.57    12.17        5.196        140.00
     2         9.18     9.83        5.964          2.70
     3         8.78    10.03        5.887          2.60

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       227.38     9.83       5.964
     2       230.18    10.03       5.887
     3       256.32    12.17       5.196

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    256.32   Tc(MIN.) =   12.17
  TOTAL AREA(ACRES) =    145.30
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    269.00 =  3405.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    275.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =   514.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.64
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    256.32
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =  12.63
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    275.00 =  3920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    275.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    276.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    451.00
  DOWNSTREAM ELEVATION(FEET) =    450.40
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.390
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.168
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    276.10 TO NODE    277.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  450.40  DOWNSTREAM ELEVATION(FEET) =  449.50
  STREET LENGTH(FEET) =   107.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.78
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    5.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.64
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.40
 STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =   8.48
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.561
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.75
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.12

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.21
 FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
 LONGEST FLOWPATH FROM NODE    276.00 TO NODE    277.00 =   167.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    277.00 TO NODE    278.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  449.50  DOWNSTREAM ELEVATION(FEET) =  409.20
 STREET LENGTH(FEET) =   875.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       7.86
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.73
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.26
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.90
 STREET FLOW TRAVEL TIME(MIN.) =   2.77   Tc(MIN.) =  11.25
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =   13.40
 TOTAL AREA(ACRES) =      4.60        PEAK FLOW RATE(CFS) =      14.33

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.98
 FLOW VELOCITY(FEET/SEC.) =  6.07   DEPTH*VELOCITY(FT*FT/SEC.) =   2.58
 LONGEST FLOWPATH FROM NODE    276.00 TO NODE    278.00 =  1042.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    278.00 TO NODE    279.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   403.20  DOWNSTREAM(FEET) =   370.60
 FLOW LENGTH(FEET) =   501.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.82
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.33
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =  11.81
 LONGEST FLOWPATH FROM NODE    276.00 TO NODE    279.00 =  1543.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    279.00 TO NODE    279.00 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.) =  11.81
 RAINFALL INTENSITY(INCH/HR) =   5.30
 TOTAL STREAM AREA(ACRES) =     4.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.33

****************************************************************************
 FLOW PROCESS FROM NODE    280.00 TO NODE    280.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    409.80
 DOWNSTREAM ELEVATION(FEET) =    408.00
 ELEVATION DIFFERENCE(FEET) =      1.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.512
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.777
 SUBAREA RUNOFF(CFS) =      0.44
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
 FLOW PROCESS FROM NODE    280.10 TO NODE    281.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.70
 STREET LENGTH(FEET) =   145.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.05
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    5.94
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =   7.60
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.039
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.20
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
  FLOW VELOCITY(FEET/SEC.) =  2.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE    280.00 TO NODE    281.00 =   225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    279.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.70  DOWNSTREAM ELEVATION(FEET) =  376.60
  STREET LENGTH(FEET) =   405.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       4.34
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.59
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =   8.84
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.387
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    5.46
  TOTAL AREA(ACRES) =      1.90        PEAK FLOW RATE(CFS) =       6.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  6.07   DEPTH*VELOCITY(FT*FT/SEC.) =   1.99
  LONGEST FLOWPATH FROM NODE    280.00 TO NODE    279.00 =   630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    279.00 TO NODE    279.00 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.) =   8.84
  RAINFALL INTENSITY(INCH/HR) =   6.39
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.92
```

```
 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        14.33     11.81         5.297          4.60
     2         6.92      8.84         6.387          1.90

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        17.64      8.84         6.387
     2        20.07     11.81         5.297

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     20.07   Tc(MIN.) =   11.81
 TOTAL AREA(ACRES) =      6.50
 LONGEST FLOWPATH FROM NODE    276.00 TO NODE    279.00 =  1543.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    279.00 TO NODE    275.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   370.60  DOWNSTREAM(FEET) =   370.00
 FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.87
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.07
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  11.89
 LONGEST FLOWPATH FROM NODE    276.00 TO NODE    275.00 =  1587.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    275.00 TO NODE    275.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        20.07     11.89         5.273         6.50
 LONGEST FLOWPATH FROM NODE    276.00 TO NODE    275.00 =  1587.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1       256.32     12.63         5.073       145.30
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    275.00 =  3920.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1      261.50      11.89         5.273
     2      275.63      12.63         5.073

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    275.63   Tc(MIN.) =   12.63
 TOTAL AREA(ACRES) =    151.80

****************************************************************************
 FLOW PROCESS FROM NODE    275.00 TO NODE    275.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
```

```
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE    275.00 TO NODE    283.00 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   370.00  DOWNSTREAM(FEET) =   366.40
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.34
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    275.63
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  12.74
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    283.00 =  4060.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    283.00 TO NODE    283.00 IS CODE =  10
--------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE    284.00 TO NODE    284.10 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    451.60
 DOWNSTREAM ELEVATION(FEET) =    450.30
 ELEVATION DIFFERENCE(FEET) =      1.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.494
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.791
 SUBAREA RUNOFF(CFS) =      0.44
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.44

**************************************************************************
 FLOW PROCESS FROM NODE    284.10 TO NODE    285.00 IS CODE =  62
--------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
 UPSTREAM ELEVATION(FEET) =  450.30  DOWNSTREAM ELEVATION(FEET) =  448.90
 STREET LENGTH(FEET) =    80.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.86
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.18
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
 STREET FLOW TRAVEL TIME(MIN.) =   0.60   Tc(MIN.) =   7.09
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.362
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.84
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.35
  FLOW VELOCITY(FEET/SEC.) =  2.42   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE    284.00 TO NODE    285.00 =   150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    285.00 TO NODE    286.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  448.90  DOWNSTREAM ELEVATION(FEET) =  436.00
  STREET LENGTH(FEET) =   176.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   0.62   Tc(MIN.) =   7.71
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.973
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     1.59
  TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.60
  FLOW VELOCITY(FEET/SEC.) =  5.03   DEPTH*VELOCITY(FT*FT/SEC.) =   1.30
  LONGEST FLOWPATH FROM NODE    284.00 TO NODE    286.00 =   326.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    286.00 TO NODE    287.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  422.00
  STREET LENGTH(FEET) =   256.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.34
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =   8.63
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.483
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.11
  TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       3.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.12
  FLOW VELOCITY(FEET/SEC.) =  4.75   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    284.00 TO NODE    287.00 =   582.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 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.) =   8.63
  RAINFALL INTENSITY(INCH/HR) =   6.48
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.70

****************************************************************************
  FLOW PROCESS FROM NODE    288.00 TO NODE    288.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    451.50
  DOWNSTREAM ELEVATION(FEET) =    447.40
  ELEVATION DIFFERENCE(FEET) =      4.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.460
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.713
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    288.10 TO NODE    289.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  447.40  DOWNSTREAM ELEVATION(FEET) =  446.10
  STREET LENGTH(FEET) =    30.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       0.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.19
    HALFSTREET FLOOD WIDTH(FEET) =    3.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   0.15   Tc(MIN.) =   5.61
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.562
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.49
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.15
  FLOW VELOCITY(FEET/SEC.) =  3.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.70
  LONGEST FLOWPATH FROM NODE    288.00 TO NODE    289.00 =   120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    289.00 TO NODE    290.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.10  DOWNSTREAM ELEVATION(FEET) =  440.00
  STREET LENGTH(FEET) =   128.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =   6.19
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.036
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.670
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.70
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.53
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    288.00 TO NODE    290.00 =   248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    287.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  440.00  DOWNSTREAM ELEVATION(FEET) =  426.00
  STREET LENGTH(FEET) =   444.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       4.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =   8.05
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.785
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.587
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    5.80
  TOTAL AREA(ACRES) =      1.80        PEAK FLOW RATE(CFS) =       7.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.19
  FLOW VELOCITY(FEET/SEC.) =  4.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.65
  LONGEST FLOWPATH FROM NODE    288.00 TO NODE    287.00 =   692.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 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.) =   8.05
  RAINFALL INTENSITY(INCH/HR) =   6.78
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.16

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.70     8.63        6.483          1.00
      2        7.16     8.05        6.785          1.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.61     8.05       6.785
      2       10.54     8.63       6.483

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     10.61   Tc(MIN.) =    8.05
  TOTAL AREA(ACRES) =      2.80
  LONGEST FLOWPATH FROM NODE    288.00 TO NODE    287.00 =   692.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    291.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   416.00  DOWNSTREAM(FEET) =    45.50
 FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  65.41
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.61
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   8.06
 LONGEST FLOWPATH FROM NODE    288.00 TO NODE    291.00 =   764.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    291.00 TO NODE    291.00 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.) =   8.06
 RAINFALL INTENSITY(INCH/HR) =   6.77
 TOTAL STREAM AREA(ACRES) =     2.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.61

****************************************************************************
 FLOW PROCESS FROM NODE    292.00 TO NODE    292.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    441.20
 DOWNSTREAM ELEVATION(FEET) =    439.90
 ELEVATION DIFFERENCE(FEET) =      1.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.494
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.791
 SUBAREA RUNOFF(CFS) =      0.44
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
 FLOW PROCESS FROM NODE    292.10 TO NODE    293.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  439.90  DOWNSTREAM ELEVATION(FEET) =  437.30
 STREET LENGTH(FEET) =   144.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.85
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.08
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.26
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
 STREET FLOW TRAVEL TIME(MIN.) =   1.06   Tc(MIN.) =   7.56
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.064
```

```
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.81
  TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       1.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.19
  FLOW VELOCITY(FEET/SEC.) =  2.41   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    293.00 =   214.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    293.00 TO NODE    291.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.30  DOWNSTREAM ELEVATION(FEET) =  422.00
  STREET LENGTH(FEET) =   393.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =   9.16
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.240
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     1.30      SUBAREA RUNOFF(CFS) =     4.62
  TOTAL AREA(ACRES) =       1.60        PEAK FLOW RATE(CFS) =       5.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.61
  FLOW VELOCITY(FEET/SEC.) =  4.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    291.00 =   607.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    291.00 TO NODE    291.00 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.) =   9.16
  RAINFALL INTENSITY(INCH/HR) =   6.24
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.69

****************************************************************************
  FLOW PROCESS FROM NODE    294.00 TO NODE    294.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    436.90
  DOWNSTREAM ELEVATION(FEET) =    433.80
  ELEVATION DIFFERENCE(FEET) =      3.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.993
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.205
  SUBAREA RUNOFF(CFS) =      0.47
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
  FLOW PROCESS FROM NODE    294.10 TO NODE    295.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.80  DOWNSTREAM ELEVATION(FEET) =  430.90
  STREET LENGTH(FEET) =    85.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    4.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   0.46   Tc(MIN.) =   6.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.826
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.34
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.40
  FLOW VELOCITY(FEET/SEC.) =  3.38   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    294.00 TO NODE    295.00 =   175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    295.00 TO NODE    291.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  430.90  DOWNSTREAM ELEVATION(FEET) =  422.00
  STREET LENGTH(FEET) =   208.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.85
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.78
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
 STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =   7.25
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.257
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =     1.00      SUBAREA RUNOFF(CFS) =    4.14
 TOTAL AREA(ACRES) =      1.40        PEAK FLOW RATE(CFS) =       5.79

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.46
 FLOW VELOCITY(FEET/SEC.) =  4.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
 LONGEST FLOWPATH FROM NODE    294.00 TO NODE    291.00 =   383.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    291.00 TO NODE    291.00 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.) =   7.25
 RAINFALL INTENSITY(INCH/HR) =   7.26
 TOTAL STREAM AREA(ACRES) =     1.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.79

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       10.61     8.06        6.775         2.80
     2        5.69     9.16        6.240         1.60
     3        5.79     7.25        7.257         1.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       20.20     7.25       7.257
     2       21.02     8.06       6.775
     3       20.44     9.16       6.240

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     21.02   Tc(MIN.) =    8.06
 TOTAL AREA(ACRES) =      5.80
 LONGEST FLOWPATH FROM NODE    288.00 TO NODE    291.00 =   764.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    291.00 TO NODE    296.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   416.00  DOWNSTREAM(FEET) =   414.00
 FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.81
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =     21.02
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   8.20
  LONGEST FLOWPATH FROM NODE    288.00 TO NODE    296.00 =   850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    296.00 TO NODE    299.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   414.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     21.02
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   8.23
  LONGEST FLOWPATH FROM NODE    288.00 TO NODE    299.00 =   911.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE    299.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    297.00 TO NODE    297.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    440.50
  DOWNSTREAM ELEVATION(FEET) =    437.50
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.384
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    297.10 TO NODE    298.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.50  DOWNSTREAM ELEVATION(FEET) =  435.00
  STREET LENGTH(FEET) =    66.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =      0.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.18
    HALFSTREET FLOOD WIDTH(FEET) =    2.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
```

```
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   0.35   Tc(MIN.) =   2.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.05      SUBAREA RUNOFF(CFS) =     0.40
  TOTAL AREA(ACRES) =      0.10        PEAK FLOW RATE(CFS) =       0.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   3.71
  FLOW VELOCITY(FEET/SEC.) =  3.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    297.00 TO NODE    298.00 =   146.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    298.00 TO NODE    298.00 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.) =   2.74
  RAINFALL INTENSITY(INCH/HR) =   9.22
  TOTAL STREAM AREA(ACRES) =     0.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE   2981.00 TO NODE   2981.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    451.60
  DOWNSTREAM ELEVATION(FEET) =    451.00
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.348
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.906
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE   2981.10 TO NODE   2982.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  446.60
  STREET LENGTH(FEET) =   448.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   3.77   Tc(MIN.) =  10.11
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.854
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =    2.00
  TOTAL AREA(ACRES) =       0.70        PEAK FLOW RATE(CFS) =       2.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  2.19   DEPTH*VELOCITY(FT*FT/SEC.) =   0.70
  LONGEST FLOWPATH FROM NODE   2981.00 TO NODE   2982.00 =   498.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2982.00 TO NODE   2983.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.60  DOWNSTREAM ELEVATION(FEET) =  435.00
  STREET LENGTH(FEET) =   178.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =  10.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.631
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.607
  SUBAREA AREA(ACRES) =     0.10      SUBAREA RUNOFF(CFS) =    0.49
  TOTAL AREA(ACRES) =       0.80        PEAK FLOW RATE(CFS) =       2.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.75
  FLOW VELOCITY(FEET/SEC.) =  4.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE   2981.00 TO NODE   2983.00 =   676.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2983.00 TO NODE    298.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    435.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.0200
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      2.74
  FLOW VELOCITY(FEET/SEC.) =   3.52   FLOW DEPTH(FEET) =   0.25
  TRAVEL TIME(MIN.) =   0.24   Tc(MIN.) =  10.98
```

```
 LONGEST FLOWPATH FROM NODE   2981.00 TO NODE    298.00 =   726.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    298.00 TO NODE    298.00 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.) =  10.98
 RAINFALL INTENSITY(INCH/HR) =   5.55
 TOTAL STREAM AREA(ACRES) =     0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.74

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         0.80     2.74        9.222         0.10
    2         2.74    10.98        5.552         0.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1         1.48     2.74       9.222
    2         3.22    10.98       5.552

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      3.22   Tc(MIN.) =   10.98
 TOTAL AREA(ACRES) =      0.90
 LONGEST FLOWPATH FROM NODE   2981.00 TO NODE    298.00 =   726.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    298.00 TO NODE    299.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  434.00  DOWNSTREAM ELEVATION(FEET) =  401.00
 STREET LENGTH(FEET) =   650.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    9.29
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.86
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.52
 STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =  13.21
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.928
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    3.09
 TOTAL AREA(ACRES) =      2.00        PEAK FLOW RATE(CFS) =       5.91
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE   2981.00 TO NODE    299.00 =  1376.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE    299.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1          5.91     13.21        4.928         2.00
  LONGEST FLOWPATH FROM NODE   2981.00 TO NODE    299.00 =  1376.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1         21.02      8.23        6.686         5.80
  LONGEST FLOWPATH FROM NODE    288.00 TO NODE    299.00 =   911.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF        Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
     1       24.71        8.23         6.686
     2       21.41       13.21         4.928

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     24.71   Tc(MIN.) =    8.23
  TOTAL AREA(ACRES) =      7.80

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE    299.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE   2100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   380.00
  FLOW LENGTH(FEET) =   277.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     24.71
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   8.52
  LONGEST FLOWPATH FROM NODE   2981.00 TO NODE   2100.00 =  1653.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2100.00 TO NODE   2100.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   2101.00 TO NODE   2101.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
```

```
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    436.50
 DOWNSTREAM ELEVATION(FEET) =    431.20
 ELEVATION DIFFERENCE(FEET) =      5.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.175
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE   2101.10 TO NODE   2102.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  431.20  DOWNSTREAM ELEVATION(FEET) =  422.00
 STREET LENGTH(FEET) =   159.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.20
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    4.32
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.95
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
 STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =   2.85
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.80
 TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       1.60

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.23
 FLOW VELOCITY(FEET/SEC.) =  4.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
 LONGEST FLOWPATH FROM NODE   2101.00 TO NODE   2102.00 =   249.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2102.00 TO NODE   2103.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  422.00  DOWNSTREAM ELEVATION(FEET) =  407.00
 STREET LENGTH(FEET) =   387.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       5.28
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =   10.31
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.48
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.49
 STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =   4.29
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.608
 SUBAREA AREA(ACRES) =     1.40      SUBAREA RUNOFF(CFS) =     7.36
 TOTAL AREA(ACRES) =      1.60        PEAK FLOW RATE(CFS) =       8.96

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.85
 FLOW VELOCITY(FEET/SEC.) =  5.07   DEPTH*VELOCITY(FT*FT/SEC.) =   1.94
 LONGEST FLOWPATH FROM NODE   2101.00 TO NODE   2103.00 =   636.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2103.00 TO NODE   2103.00 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.) =   4.29
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     1.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.96

****************************************************************************
 FLOW PROCESS FROM NODE   2104.00 TO NODE   2104.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    422.70
 DOWNSTREAM ELEVATION(FEET) =    420.80
 ELEVATION DIFFERENCE(FEET) =      1.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.396
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.868
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE   2104.10 TO NODE   2105.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  420.80  DOWNSTREAM ELEVATION(FEET) =  418.30
 STREET LENGTH(FEET) =   109.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.08
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.43
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
 STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =   7.09
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.360
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =    1.26
 TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =       1.68

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.85
 FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
 LONGEST FLOWPATH FROM NODE   2104.00 TO NODE   2105.00 =   189.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2105.00 TO NODE   2103.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  418.30  DOWNSTREAM ELEVATION(FEET) =  407.00
 STREET LENGTH(FEET) =   313.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.75
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.05
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.24
 STREET FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =   8.38
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.610
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =     1.10      SUBAREA RUNOFF(CFS) =    4.14
 TOTAL AREA(ACRES) =       1.50        PEAK FLOW RATE(CFS) =       5.65

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.76
 FLOW VELOCITY(FEET/SEC.) =  4.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.51
 LONGEST FLOWPATH FROM NODE   2104.00 TO NODE   2103.00 =   502.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2103.00 TO NODE   2103.00 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.) =   8.38
 RAINFALL INTENSITY(INCH/HR) =   6.61
 TOTAL STREAM AREA(ACRES) =     1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.65

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.96     4.29        9.222          1.60
     2        5.65     8.38        6.610          1.50

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       11.85     4.29        9.222
     2       12.08     8.38        6.610

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     12.08   Tc(MIN.) =    8.38
 TOTAL AREA(ACRES) =      3.10
 LONGEST FLOWPATH FROM NODE   2101.00 TO NODE   2103.00 =   636.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2103.00 TO NODE   2100.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   401.00  DOWNSTREAM(FEET) =   380.00
 FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.14
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.08
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   8.45
 LONGEST FLOWPATH FROM NODE   2101.00 TO NODE   2100.00 =   732.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2100.00 TO NODE   2100.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       12.08     8.45        6.573          3.10
 LONGEST FLOWPATH FROM NODE   2101.00 TO NODE   2100.00 =   732.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       24.71     8.52        6.537          7.80
 LONGEST FLOWPATH FROM NODE   2981.00 TO NODE   2100.00 =  1653.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       36.57     8.45        6.573
     2       36.72     8.52        6.537

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
 PEAK FLOW RATE(CFS) =     36.72   Tc(MIN.) =    8.52
 TOTAL AREA(ACRES) =     10.90

****************************************************************************
 FLOW PROCESS FROM NODE   2100.00 TO NODE   2100.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2100.00 TO NODE    283.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   366.40
 FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.40
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     36.72
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   8.82
 LONGEST FLOWPATH FROM NODE   2981.00 TO NODE    283.00 =  1943.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    283.00 TO NODE    283.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1       36.72     8.82       6.395       10.90
 LONGEST FLOWPATH FROM NODE   2981.00 TO NODE    283.00 =  1943.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1      275.63    12.74       5.045      151.80
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    283.00 =  4060.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      227.57       8.82        6.395
    2      304.59      12.74        5.045

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    304.59   Tc(MIN.) =   12.74
 TOTAL AREA(ACRES) =    162.70

****************************************************************************
 FLOW PROCESS FROM NODE    283.00 TO NODE    283.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    283.00 TO NODE   2106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   366.40  DOWNSTREAM(FEET) =   350.00
 FLOW LENGTH(FEET) =   268.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  30.37
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    304.59
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  12.88
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2106.00 =  4328.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2106.00 TO NODE   2106.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2108.00 TO NODE   2108.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    386.00
 DOWNSTREAM ELEVATION(FEET) =    381.20
 ELEVATION DIFFERENCE(FEET) =      4.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.248
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE   2108.10 TO NODE   2109.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  381.20  DOWNSTREAM ELEVATION(FEET) =  371.90
 STREET LENGTH(FEET) =   173.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       2.41
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.65
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.29
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
 STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =   2.92
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    3.21
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       4.01

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.48
 FLOW VELOCITY(FEET/SEC.) =  4.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.42
 LONGEST FLOWPATH FROM NODE   2108.00 TO NODE   2109.00 =   263.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   2109.00 TO NODE   2109.00 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.) =   2.92
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.01

****************************************************************************
 FLOW PROCESS FROM NODE   2110.00 TO NODE   2110.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    422.00
 DOWNSTREAM ELEVATION(FEET) =    418.40
 ELEVATION DIFFERENCE(FEET) =      3.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.243
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.40
 TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
 FLOW PROCESS FROM NODE   2110.10 TO NODE   2111.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  418.40  DOWNSTREAM ELEVATION(FEET) =  411.00
 STREET LENGTH(FEET) =   167.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.60
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.17
   HALFSTREET FLOOD WIDTH(FEET) =    2.35
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.47
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
 STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =   3.04
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.05      SUBAREA RUNOFF(CFS) =    0.40
 TOTAL AREA(ACRES) =      0.10        PEAK FLOW RATE(CFS) =       0.80

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   3.50
```

```
 FLOW VELOCITY(FEET/SEC.) =  3.34   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE   2110.00 TO NODE   2111.00 =   247.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2111.00 TO NODE   2109.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  411.00  DOWNSTREAM ELEVATION(FEET) =  371.90
 STREET LENGTH(FEET) =   691.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       7.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   10.76
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.57
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.90
 STREET FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   5.11
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.090
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.582
 SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =   12.44
 TOTAL AREA(ACRES) =      2.50        PEAK FLOW RATE(CFS) =      13.23

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.91
 FLOW VELOCITY(FEET/SEC.) =  6.44   DEPTH*VELOCITY(FT*FT/SEC.) =   2.61
 LONGEST FLOWPATH FROM NODE   2110.00 TO NODE   2109.00 =   938.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2109.00 TO NODE   2109.00 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.) =   5.11
 RAINFALL INTENSITY(INCH/HR) =   9.09
 TOTAL STREAM AREA(ACRES) =     2.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.23

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         4.01     2.92        9.222         0.50
    2        13.23     5.11        9.090         2.50

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        11.56     2.92        9.222
```

```
     2       17.18      5.11       9.090

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     17.18   Tc(MIN.) =    5.11
  TOTAL AREA(ACRES) =      3.00
  LONGEST FLOWPATH FROM NODE   2110.00 TO NODE   2109.00 =   938.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2109.00 TO NODE   2112.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.90  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.0180
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =     17.18
  FLOW VELOCITY(FEET/SEC.) =   5.38   FLOW DEPTH(FEET) =   0.52
  TRAVEL TIME(MIN.) =   0.15   Tc(MIN.) =   5.27
  LONGEST FLOWPATH FROM NODE   2110.00 TO NODE   2112.00 =   988.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2112.00 TO NODE   2112.00 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.) =   5.27
  RAINFALL INTENSITY(INCH/HR) =   8.92
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.18

****************************************************************************
  FLOW PROCESS FROM NODE  21121.00 TO NODE  21121.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    388.80
  DOWNSTREAM ELEVATION(FEET) =    387.10
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.637
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.682
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE  21121.10 TO NODE  21122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  387.10  DOWNSTREAM ELEVATION(FEET) =  385.30
  STREET LENGTH(FEET) =    90.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       0.64
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    4.04
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
 STREET FLOW TRAVEL TIME(MIN.) =   0.66   Tc(MIN.) =   7.29
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.229
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =     0.10      SUBAREA RUNOFF(CFS) =     0.41
 TOTAL AREA(ACRES) =       0.20        PEAK FLOW RATE(CFS) =       0.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.81
 FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.52
 LONGEST FLOWPATH FROM NODE  21121.00 TO NODE  21122.00 =   170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  21122.00 TO NODE  21123.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  385.30  DOWNSTREAM ELEVATION(FEET) =  376.60
 STREET LENGTH(FEET) =   521.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.53
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.53
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.13
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
 STREET FLOW TRAVEL TIME(MIN.) =   2.77   Tc(MIN.) =  10.06
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.873
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =     2.20      SUBAREA RUNOFF(CFS) =     7.36
 TOTAL AREA(ACRES) =       2.40        PEAK FLOW RATE(CFS) =       8.03

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.52
 FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
 LONGEST FLOWPATH FROM NODE  21121.00 TO NODE  21123.00 =   691.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  21123.00 TO NODE   2112.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  376.60  DOWNSTREAM ELEVATION(FEET) =  371.00
```

```
  STREET LENGTH(FEET) =   136.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       8.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   0.45   Tc(MIN.) =  10.51
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.711
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.582
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.50
  TOTAL AREA(ACRES) =      2.50        PEAK FLOW RATE(CFS) =       8.31

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.29
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.90
  LONGEST FLOWPATH FROM NODE  21121.00 TO NODE   2112.00 =   827.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2112.00 TO NODE   2112.00 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.) =  10.51
  RAINFALL INTENSITY(INCH/HR) =   5.71
  TOTAL STREAM AREA(ACRES) =     2.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.18     5.27        8.917          3.00
      2        8.31    10.51        5.711          2.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       21.35     5.27       8.917
      2       19.31    10.51       5.711

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     21.35   Tc(MIN.) =    5.27
  TOTAL AREA(ACRES) =      5.50
  LONGEST FLOWPATH FROM NODE   2110.00 TO NODE   2112.00 =   988.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2112.00 TO NODE   2106.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  371.00  DOWNSTREAM ELEVATION(FEET) =  356.00
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =      23.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =   5.85
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.333
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.630
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    3.62
  TOTAL AREA(ACRES) =      6.00        PEAK FLOW RATE(CFS) =      31.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  7.62   DEPTH*VELOCITY(FT*FT/SEC.) =   3.71
  LONGEST FLOWPATH FROM NODE   2110.00 TO NODE   2106.00 =  1248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2106.00 TO NODE   2106.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
      1        31.50     5.85        8.333         6.00
  LONGEST FLOWPATH FROM NODE   2110.00 TO NODE   2106.00 =  1248.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
      1       304.59    12.88        5.008       162.70
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2106.00 =  4328.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1      169.81       5.85        8.333
      2      323.52      12.88        5.008

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    323.52   Tc(MIN.) =   12.88
  TOTAL AREA(ACRES) =    168.70

****************************************************************************
  FLOW PROCESS FROM NODE   2106.00 TO NODE   2106.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
```

```
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE   2106.00 TO NODE   2113.00 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   330.00
 FLOW LENGTH(FEET) =   439.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  27.42
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    323.52
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =  13.15
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2113.00 =  4767.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE   2106.00 TO NODE   2113.00 IS CODE =  81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.942
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3653
 SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.58
 TOTAL AREA(ACRES) =    169.30   TOTAL RUNOFF(CFS) =  323.52
 TC(MIN.) =  13.15
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

**************************************************************************
 FLOW PROCESS FROM NODE   2113.00 TO NODE   2113.00 IS CODE =  10
--------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE   2114.00 TO NODE   2114.10 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    424.80
 DOWNSTREAM ELEVATION(FEET) =    422.00
 ELEVATION DIFFERENCE(FEET) =      2.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.200
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.027
 SUBAREA RUNOFF(CFS) =      0.46
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.46

**************************************************************************
 FLOW PROCESS FROM NODE   2114.10 TO NODE   2115.00 IS CODE =  62
--------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
 UPSTREAM ELEVATION(FEET) =  422.00  DOWNSTREAM ELEVATION(FEET) =  418.90
 STREET LENGTH(FEET) =   100.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  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) =       1.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.78
  STREET FLOW TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =   6.73
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.615
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    2.17
  TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       2.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.92
  FLOW VELOCITY(FEET/SEC.) =  3.49   DEPTH*VELOCITY(FT*FT/SEC.) =   0.99
  LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2115.00 =   190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2115.00 TO NODE   2116.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  418.90  DOWNSTREAM ELEVATION(FEET) =  396.20
  STREET LENGTH(FEET) =   590.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       6.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.64
  STREET FLOW TRAVEL TIME(MIN.) =   2.10   Tc(MIN.) =   8.83
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.390
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    7.65
  TOTAL AREA(ACRES) =      2.70        PEAK FLOW RATE(CFS) =       9.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.35
  FLOW VELOCITY(FEET/SEC.) =  5.17   DEPTH*VELOCITY(FT*FT/SEC.) =   2.03
  LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2116.00 =   780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2116.00 TO NODE   2117.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   389.50
FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.53
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      9.83
PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   8.91
LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2117.00 =   815.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   2117.00 TO NODE   2117.00 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.) =   8.91
RAINFALL INTENSITY(INCH/HR) =   6.35
TOTAL STREAM AREA(ACRES) =     2.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.83

****************************************************************************
FLOW PROCESS FROM NODE   2118.00 TO NODE   2118.10 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  87
INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
UPSTREAM ELEVATION(FEET) =    425.60
DOWNSTREAM ELEVATION(FEET) =    423.60
ELEVATION DIFFERENCE(FEET) =      2.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.287
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.955
SUBAREA RUNOFF(CFS) =      0.45
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
FLOW PROCESS FROM NODE   2118.10 TO NODE   2119.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
UPSTREAM ELEVATION(FEET) =  423.60  DOWNSTREAM ELEVATION(FEET) =  419.60
STREET LENGTH(FEET) =   167.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.020
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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) =       1.28
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.24
  HALFSTREET FLOOD WIDTH(FEET) =    5.89
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.75
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
STREET FLOW TRAVEL TIME(MIN.) =   1.01   Tc(MIN.) =   7.30
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.224
```

```
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     1.65
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       2.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.51
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE   2118.00 TO NODE   2119.00 =   247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2119.00 TO NODE   2117.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  419.60  DOWNSTREAM ELEVATION(FEET) =  396.20
  STREET LENGTH(FEET) =   469.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =   8.99
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.314
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     1.00      SUBAREA RUNOFF(CFS) =     3.60
  TOTAL AREA(ACRES) =      1.50        PEAK FLOW RATE(CFS) =       5.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.85
  FLOW VELOCITY(FEET/SEC.) =  4.96   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
  LONGEST FLOWPATH FROM NODE   2118.00 TO NODE   2117.00 =   716.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2117.00 TO NODE   2117.00 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.) =   8.99
  RAINFALL INTENSITY(INCH/HR) =   6.31
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.83     8.91        6.354          2.70
```

```
    2        5.40      8.99        6.314          1.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       15.18      8.91        6.354
      2       15.17      8.99        6.314

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     15.18   Tc(MIN.) =     8.91
  TOTAL AREA(ACRES) =      4.20
  LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2117.00 =   815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2117.00 TO NODE  21171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   380.00
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     15.18
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   9.47
  LONGEST FLOWPATH FROM NODE   2114.00 TO NODE  21171.00 =  1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  21171.00 TO NODE  21171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   2120.00 TO NODE   2120.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    447.20
  DOWNSTREAM ELEVATION(FEET) =    442.00
  ELEVATION DIFFERENCE(FEET) =      5.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.189
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE   2120.10 TO NODE   2121.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  442.00  DOWNSTREAM ELEVATION(FEET) =  422.00
  STREET LENGTH(FEET) =   344.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  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) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.40
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.30   Tc(MIN.) =   3.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    3.21
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       4.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.33
  FLOW VELOCITY(FEET/SEC.) =  4.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE   2120.00 TO NODE   2121.00 =   434.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2121.00 TO NODE   2122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  422.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =   405.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       7.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.06
  STREET FLOW TRAVEL TIME(MIN.) =   1.12   Tc(MIN.) =   4.61
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.649
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    7.36
  TOTAL AREA(ACRES) =      1.90        PEAK FLOW RATE(CFS) =      11.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.64
  FLOW VELOCITY(FEET/SEC.) =  6.62   DEPTH*VELOCITY(FT*FT/SEC.) =   2.51
  LONGEST FLOWPATH FROM NODE   2120.00 TO NODE   2122.00 =   839.00 FEET.

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

```
 FLOW PROCESS FROM NODE   2122.00 TO NODE   2123.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    395.00  DOWNSTREAM(FEET) =    394.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 CHANNEL FLOW THRU SUBAREA(CFS) =     11.37
 FLOW VELOCITY(FEET/SEC.) =   3.90   FLOW DEPTH(FEET) =   0.49
 TRAVEL TIME(MIN.) =   0.21   Tc(MIN.) =   4.83
 LONGEST FLOWPATH FROM NODE   2120.00 TO NODE   2123.00 =   889.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2123.00 TO NODE   2123.00 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.) =   4.83
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     1.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.37

****************************************************************************
 FLOW PROCESS FROM NODE   2124.00 TO NODE   2124.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    422.80
 DOWNSTREAM ELEVATION(FEET) =    420.20
 ELEVATION DIFFERENCE(FEET) =      2.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.355
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.900
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE   2124.10 TO NODE   2125.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  420.20  DOWNSTREAM ELEVATION(FEET) =  418.10
 STREET LENGTH(FEET) =    72.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.88
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    4.43
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.81
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   0.43   Tc(MIN.) =   6.78
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.576
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.86
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.30

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.63
 FLOW VELOCITY(FEET/SEC.) =  2.97   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
 LONGEST FLOWPATH FROM NODE   2124.00 TO NODE   2125.00 =   162.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2125.00 TO NODE   2123.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  418.10  DOWNSTREAM ELEVATION(FEET) =  394.50
 STREET LENGTH(FEET) =   314.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.07
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.90
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.17
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
 STREET FLOW TRAVEL TIME(MIN.) =   1.01   Tc(MIN.) =   7.80
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.925
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    3.55
 TOTAL AREA(ACRES) =      1.20        PEAK FLOW RATE(CFS) =       4.74

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.48
 FLOW VELOCITY(FEET/SEC.) =  5.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
 LONGEST FLOWPATH FROM NODE   2124.00 TO NODE   2123.00 =   476.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2123.00 TO NODE   2123.00 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.) =   7.80
 RAINFALL INTENSITY(INCH/HR) =   6.92
 TOTAL STREAM AREA(ACRES) =     1.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.74

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)     (ACRE)
     1        11.37      4.83        9.222          1.90
     2         4.74      7.80        6.925          1.20

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        14.30      4.83       9.222
     2        13.28      7.80       6.925

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     14.30   Tc(MIN.) =    4.83
  TOTAL AREA(ACRES) =      3.10
  LONGEST FLOWPATH FROM NODE   2120.00 TO NODE   2123.00 =   889.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2123.00 TO NODE  21171.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  394.50  DOWNSTREAM ELEVATION(FEET) =  386.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =      15.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   15.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =   5.52
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.649
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.634
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.50
  TOTAL AREA(ACRES) =      3.30        PEAK FLOW RATE(CFS) =      18.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.21
  FLOW VELOCITY(FEET/SEC.) =  5.87   DEPTH*VELOCITY(FT*FT/SEC.) =   2.76
  LONGEST FLOWPATH FROM NODE   2120.00 TO NODE  21171.00 =  1124.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  21171.00 TO NODE  21171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF     Tc       INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1        18.08     5.52       8.649        3.30
  LONGEST FLOWPATH FROM NODE   2120.00 TO NODE  21171.00 =  1124.00 FEET.
```

```
 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        15.18      9.47        6.108         4.20
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE  21171.00 =  1175.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1       26.94       5.52         8.649
    2       27.95       9.47         6.108

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     27.95   Tc(MIN.) =    9.47
 TOTAL AREA(ACRES) =      7.50

****************************************************************************
 FLOW PROCESS FROM NODE  21171.00 TO NODE  21171.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2123.00 TO NODE  21171.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.108
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5926
 SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    6.27
 TOTAL AREA(ACRES) =      9.30   TOTAL RUNOFF(CFS) =   33.66
 TC(MIN.) =   9.47

****************************************************************************
 FLOW PROCESS FROM NODE  21171.00 TO NODE   2128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   372.00
 FLOW LENGTH(FEET) =   283.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     33.66
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   9.83
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2128.00 =  1458.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2128.00 TO NODE   2128.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.83
 RAINFALL INTENSITY(INCH/HR) =   5.96
 TOTAL STREAM AREA(ACRES) =     9.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     33.66

****************************************************************************
 FLOW PROCESS FROM NODE   2129.00 TO NODE   2129.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==========================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    420.00
  DOWNSTREAM ELEVATION(FEET) =    408.00
  ELEVATION DIFFERENCE(FEET) =     12.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.428
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

**************************************************************************
  FLOW PROCESS FROM NODE   2129.10 TO NODE   2130.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  408.30  DOWNSTREAM ELEVATION(FEET) =  394.20
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.37   Tc(MIN.) =   4.79
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.58
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       2.10

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   4.97
  FLOW VELOCITY(FEET/SEC.) =  5.75   DEPTH*VELOCITY(FT*FT/SEC.) =   1.30
  LONGEST FLOWPATH FROM NODE   2129.00 TO NODE   2130.00 =   220.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE   2130.00 TO NODE   2131.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  394.20  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   303.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
 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) =       3.95
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.54
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
 STREET FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =   6.11
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.103
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    3.70
 TOTAL AREA(ACRES) =      1.20        PEAK FLOW RATE(CFS) =       5.54

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.07
 FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
 LONGEST FLOWPATH FROM NODE   2129.00 TO NODE   2131.00 =   523.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2131.00 TO NODE   2128.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  385.00  DOWNSTREAM ELEVATION(FEET) =  379.00
 STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       6.19
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.83
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
 STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =   7.01
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.417
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.613
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.29
 TOTAL AREA(ACRES) =      1.40        PEAK FLOW RATE(CFS) =       6.36

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.98
 FLOW VELOCITY(FEET/SEC.) =  4.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
 LONGEST FLOWPATH FROM NODE   2129.00 TO NODE   2128.00 =   743.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2128.00 TO NODE   2128.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.01
  RAINFALL INTENSITY(INCH/HR) =    7.42
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.36

********************************************************************************
  FLOW PROCESS FROM NODE   2132.00 TO NODE   2132.10 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    397.00
  DOWNSTREAM ELEVATION(FEET) =    395.40
  ELEVATION DIFFERENCE(FEET) =      1.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.773
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.582
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

********************************************************************************
  FLOW PROCESS FROM NODE   2132.10 TO NODE   2133.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  395.40  DOWNSTREAM ELEVATION(FEET) =  393.80
  STREET LENGTH(FEET) =    80.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       0.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =   7.36
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.185
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.81
  FLOW VELOCITY(FEET/SEC.) =  2.34   DEPTH*VELOCITY(FT*FT/SEC.) =   0.52
  LONGEST FLOWPATH FROM NODE   2132.00 TO NODE   2133.00 =   160.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE   2133.00 TO NODE   2134.00 IS CODE =  62
--------------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  393.80  DOWNSTREAM ELEVATION(FEET) =  378.40
  STREET LENGTH(FEET) =   481.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.74
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   2.14   Tc(MIN.) =   9.51
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.093
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     1.40      SUBAREA RUNOFF(CFS) =     4.86
  TOTAL AREA(ACRES) =      1.60        PEAK FLOW RATE(CFS) =       5.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.97
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE   2132.00 TO NODE   2134.00 =   641.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2134.00 TO NODE   2128.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   372.00
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.56
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   9.58
  LONGEST FLOWPATH FROM NODE   2132.00 TO NODE   2128.00 =   677.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2128.00 TO NODE   2128.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   9.58
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.56

****************************************************************************
  FLOW PROCESS FROM NODE   2136.00 TO NODE   2136.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==========================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    422.60
  DOWNSTREAM ELEVATION(FEET) =    417.90
  ELEVATION DIFFERENCE(FEET) =      4.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.264
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

**************************************************************************
  FLOW PROCESS FROM NODE   2136.10 TO NODE   2137.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  417.90  DOWNSTREAM ELEVATION(FEET) =  396.00
  STREET LENGTH(FEET) =   422.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =   3.98
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    2.41
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       3.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.72
  FLOW VELOCITY(FEET/SEC.) =  4.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE   2136.00 TO NODE   2137.00 =   512.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE   2137.00 TO NODE   2128.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  396.00  DOWNSTREAM ELEVATION(FEET) =  379.00
  STREET LENGTH(FEET) =   586.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
 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) =       7.64
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.74
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.38
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.67
 STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =   6.21
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.020
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.622
 SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    8.69
 TOTAL AREA(ACRES) =      2.30        PEAK FLOW RATE(CFS) =      11.48

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.03
 FLOW VELOCITY(FEET/SEC.) =  4.83   DEPTH*VELOCITY(FT*FT/SEC.) =   2.06
 LONGEST FLOWPATH FROM NODE   2136.00 TO NODE   2128.00 =  1098.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2128.00 TO NODE   2128.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
 TIME OF CONCENTRATION(MIN.) =   6.21
 RAINFALL INTENSITY(INCH/HR) =   8.02
 TOTAL STREAM AREA(ACRES) =     2.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.48

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       33.66     9.83        5.962         9.30
     2        6.36     7.01        7.417         1.40
     3        5.56     9.58        6.063         1.60
     4       11.48     6.21        8.020         2.30

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  4 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       41.97     6.21       8.020
     2       45.04     7.01       7.417
     3       52.23     9.58       6.063
     4       52.77     9.83       5.962

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     52.77   Tc(MIN.) =    9.83
 TOTAL AREA(ACRES) =     14.60
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2128.00 =  1458.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2128.00 TO NODE   2135.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   350.00
 FLOW LENGTH(FEET) =   427.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.60
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     52.77
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =  10.21
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2135.00 =  1885.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2135.00 TO NODE   2135.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2140.00 TO NODE   2140.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    391.10
 DOWNSTREAM ELEVATION(FEET) =    387.80
 ELEVATION DIFFERENCE(FEET) =      3.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.309
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.40
 TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
 FLOW PROCESS FROM NODE   2140.10 TO NODE   2141.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  387.80  DOWNSTREAM ELEVATION(FEET) =  381.40
 STREET LENGTH(FEET) =   159.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.60
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.18
   HALFSTREET FLOOD WIDTH(FEET) =    2.57
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.27
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
 STREET FLOW TRAVEL TIME(MIN.) =   0.81   Tc(MIN.) =   3.12
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.05      SUBAREA RUNOFF(CFS) =    0.40
 TOTAL AREA(ACRES) =      0.10        PEAK FLOW RATE(CFS) =       0.80
```

```
 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   3.66
 FLOW VELOCITY(FEET/SEC.) =  3.18   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
 LONGEST FLOWPATH FROM NODE   2140.00 TO NODE   2141.00 =   239.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2141.00 TO NODE   2141.00 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.) =   3.12
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     0.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE   2142.00 TO NODE   2143.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    384.00
 DOWNSTREAM ELEVATION(FEET) =    382.70
 ELEVATION DIFFERENCE(FEET) =      1.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.494
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.791
 SUBAREA RUNOFF(CFS) =      0.44
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
 FLOW PROCESS FROM NODE   2143.00 TO NODE   2141.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  382.70  DOWNSTREAM ELEVATION(FEET) =  381.40
 STREET LENGTH(FEET) =   119.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.46
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.72
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
 STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =   7.46
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.122
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    2.03
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       2.44
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.70
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE   2142.00 TO NODE   2141.00 =   189.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2141.00 TO NODE   2141.00 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.) =   7.46
  RAINFALL INTENSITY(INCH/HR) =   7.12
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.80     3.12        9.222          0.10
      2        2.44     7.46        7.122          0.60

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        1.82     3.12       9.222
      2        3.06     7.46       7.122

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      3.06   Tc(MIN.) =    7.46
  TOTAL AREA(ACRES) =      0.70
  LONGEST FLOWPATH FROM NODE   2140.00 TO NODE   2141.00 =   239.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2141.00 TO NODE   2144.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.40  DOWNSTREAM(FEET) =    381.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.0080
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      3.06
  FLOW VELOCITY(FEET/SEC.) =   2.56   FLOW DEPTH(FEET) =   0.32
  TRAVEL TIME(MIN.) =   0.33   Tc(MIN.) =   7.79
  LONGEST FLOWPATH FROM NODE   2140.00 TO NODE   2144.00 =   289.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2144.00 TO NODE   2144.00 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.) =   7.79
  RAINFALL INTENSITY(INCH/HR) =   6.93
  TOTAL STREAM AREA(ACRES) =     0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.06

****************************************************************************
  FLOW PROCESS FROM NODE   2145.00 TO NODE   2145.10 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    383.70
  DOWNSTREAM ELEVATION(FEET) =    382.70
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.087
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.364
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.42

********************************************************************************
  FLOW PROCESS FROM NODE   2145.10 TO NODE   2146.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  382.70  DOWNSTREAM ELEVATION(FEET) =  381.70
  STREET LENGTH(FEET) =    66.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       0.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =   7.64
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.018
  RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.585
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.23
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
  LONGEST FLOWPATH FROM NODE   2145.00 TO NODE   2146.00 =   136.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE   2146.00 TO NODE   2144.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  381.70  DOWNSTREAM ELEVATION(FEET) =  381.00
  STREET LENGTH(FEET) =   119.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.73
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.54
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.69
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.53
 STREET FLOW TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =   8.81
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.398
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.574
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.82
 TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       2.57

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.32
 FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE   2145.00 TO NODE   2144.00 =   255.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2144.00 TO NODE   2144.00 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.) =   8.81
 RAINFALL INTENSITY(INCH/HR) =   6.40
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.57

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.06     7.79        6.929          0.70
     2        2.57     8.81        6.398          0.70

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        5.33     7.79       6.929
     2        5.39     8.81       6.398

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      5.39   Tc(MIN.) =    8.81
 TOTAL AREA(ACRES) =      1.40
 LONGEST FLOWPATH FROM NODE   2140.00 TO NODE   2144.00 =   289.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2144.00 TO NODE   2139.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  381.00  DOWNSTREAM ELEVATION(FEET) =  376.60
 STREET LENGTH(FEET) =   139.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       5.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.47
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =   9.36
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.153
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.612
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.54
  TOTAL AREA(ACRES) =      1.50        PEAK FLOW RATE(CFS) =       5.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.07
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE   2140.00 TO NODE   2139.00 =   428.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2139.00 TO NODE   2135.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  376.60  DOWNSTREAM ELEVATION(FEET) =  357.00
  STREET LENGTH(FEET) =   367.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       7.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.13   Tc(MIN.) =  10.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.719
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.596
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    2.93
  TOTAL AREA(ACRES) =      2.40        PEAK FLOW RATE(CFS) =       8.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.58
  FLOW VELOCITY(FEET/SEC.) =  5.61   DEPTH*VELOCITY(FT*FT/SEC.) =   2.01
  LONGEST FLOWPATH FROM NODE   2140.00 TO NODE   2135.00 =   795.00 FEET.

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

```
 FLOW PROCESS FROM NODE   2135.00 TO NODE   2135.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF     Tc       INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1         8.18    10.49        5.719        2.40
 LONGEST FLOWPATH FROM NODE   2140.00 TO NODE   2135.00 =   795.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF     Tc       INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1        52.77    10.21        5.817       14.60
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2135.00 =  1885.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1       60.74      10.21        5.817
    2       60.06      10.49        5.719

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     60.74   Tc(MIN.) =   10.21
 TOTAL AREA(ACRES) =     17.00

****************************************************************************
 FLOW PROCESS FROM NODE   2135.00 TO NODE   2135.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2139.00 TO NODE   2135.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.817
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5941
 SUBAREA AREA(ACRES) =     1.80   SUBAREA RUNOFF(CFS) =     5.97
 TOTAL AREA(ACRES) =     18.80   TOTAL RUNOFF(CFS) =    64.97
 TC(MIN.) =  10.21

****************************************************************************
 FLOW PROCESS FROM NODE   2135.00 TO NODE   2149.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   349.30
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     64.97
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  10.31
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2149.00 =  1945.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2149.00 TO NODE   2149.00 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.) =  10.31
 RAINFALL INTENSITY(INCH/HR) =   5.78
 TOTAL STREAM AREA(ACRES) =    18.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     64.97

****************************************************************************
 FLOW PROCESS FROM NODE   2150.00 TO NODE   2150.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    380.40
 DOWNSTREAM ELEVATION(FEET) =    377.40
 ELEVATION DIFFERENCE(FEET) =      3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.059
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.147
 SUBAREA RUNOFF(CFS) =      0.46
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
 FLOW PROCESS FROM NODE   2150.10 TO NODE   2151.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  377.40  DOWNSTREAM ELEVATION(FEET) =  376.30
 STREET LENGTH(FEET) =    45.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       0.70
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    3.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.53
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
 STREET FLOW TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =   6.36
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.900
 RESIDENTAIL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.585
 SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.47
 TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.92

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.86
 FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
 LONGEST FLOWPATH FROM NODE   2150.00 TO NODE   2151.00 =   135.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2151.00 TO NODE   2149.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
  UPSTREAM ELEVATION(FEET) =  376.30  DOWNSTREAM ELEVATION(FEET) =  357.00
  STREET LENGTH(FEET) =   433.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.32
  STREET FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =   7.99
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.816
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.572
  SUBAREA AREA(ACRES) =     1.50      SUBAREA RUNOFF(CFS) =     5.83
  TOTAL AREA(ACRES) =      1.70        PEAK FLOW RATE(CFS) =       6.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.02
  FLOW VELOCITY(FEET/SEC.) =  4.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.72
  LONGEST FLOWPATH FROM NODE   2150.00 TO NODE   2149.00 =   568.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2149.00 TO NODE   2149.00 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.) =   7.99
  RAINFALL INTENSITY(INCH/HR) =   6.82
  TOTAL STREAM AREA(ACRES) =     1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.62

****************************************************************************
  FLOW PROCESS FROM NODE   2153.00 TO NODE   2153.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    391.50
  DOWNSTREAM ELEVATION(FEET) =    388.70
  ELEVATION DIFFERENCE(FEET) =      2.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.200
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.027
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE   2153.10 TO NODE   2154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  388.70  DOWNSTREAM ELEVATION(FEET) =  386.30
 STREET LENGTH(FEET) =    76.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.12
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.03
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.01
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
 STREET FLOW TRAVEL TIME(MIN.) =   0.42   Tc(MIN.) =   6.62
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.694
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.32
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.75

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.50
 FLOW VELOCITY(FEET/SEC.) =  3.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
 LONGEST FLOWPATH FROM NODE   2153.00 TO NODE   2154.00 =   166.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2154.00 TO NODE   2149.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  386.30  DOWNSTREAM ELEVATION(FEET) =  357.00
 STREET LENGTH(FEET) =   727.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       5.85
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   10.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.66
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.58
 STREET FLOW TRAVEL TIME(MIN.) =   2.60   Tc(MIN.) =   9.22
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.215
 RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    2.30      SUBAREA RUNOFF(CFS) =    8.15
 TOTAL AREA(ACRES) =      2.70        PEAK FLOW RATE(CFS) =       9.56

 END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.05
 FLOW VELOCITY(FEET/SEC.) =  5.25   DEPTH*VELOCITY(FT*FT/SEC.) =   2.03
 LONGEST FLOWPATH FROM NODE   2153.00 TO NODE   2149.00 =   893.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2149.00 TO NODE   2149.00 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.) =   9.22
 RAINFALL INTENSITY(INCH/HR) =   6.21
 TOTAL STREAM AREA(ACRES) =     2.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.56

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       64.97    10.31        5.784         18.80
    2        6.62     7.99        6.816          1.70
    3        9.56     9.22        6.215          2.70

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       65.28     7.99       6.816
    2       73.73     9.22       6.215
    3       79.49    10.31       5.784

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     79.49   Tc(MIN.) =   10.31
 TOTAL AREA(ACRES) =     23.20
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2149.00 =  1945.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2149.00 TO NODE   2155.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   349.30  DOWNSTREAM(FEET) =   330.50
 FLOW LENGTH(FEET) =   147.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  29.01
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     79.49
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  10.39
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2155.00 =  2092.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2155.00 TO NODE   2155.00 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.) =  10.39
 RAINFALL INTENSITY(INCH/HR) =   5.75
 TOTAL STREAM AREA(ACRES) =    23.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     79.49

****************************************************************************
 FLOW PROCESS FROM NODE   2156.00 TO NODE   2157.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    396.20
  DOWNSTREAM ELEVATION(FEET) =    391.00
  ELEVATION DIFFERENCE(FEET) =      5.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.189
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE   2157.00 TO NODE   2155.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  391.00  DOWNSTREAM ELEVATION(FEET) =  336.00
  STREET LENGTH(FEET) =   967.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       4.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   3.22   Tc(MIN.) =   5.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.765
  RESIDENTAIL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.590
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    6.99
  TOTAL AREA(ACRES) =      1.50        PEAK FLOW RATE(CFS) =       7.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.17
  FLOW VELOCITY(FEET/SEC.) =  5.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.99
  LONGEST FLOWPATH FROM NODE   2156.00 TO NODE   2155.00 =  1057.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2155.00 TO NODE   2155.00 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.) =   5.41
  RAINFALL INTENSITY(INCH/HR) =   8.76
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.76
```

```
 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1         79.49     10.39         5.753          23.20
    2          7.76      5.41         8.765           1.50

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         59.94      5.41         8.765
    2         84.58     10.39         5.753

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     84.58   Tc(MIN.) =   10.39
 TOTAL AREA(ACRES) =     24.70
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2155.00 =  2092.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2155.00 TO NODE   2113.00 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) =    39.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.17
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     84.58
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  10.44
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2113.00 =  2131.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2113.00 TO NODE   2113.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         84.58     10.44         5.734        24.70
 LONGEST FLOWPATH FROM NODE   2114.00 TO NODE   2113.00 =  2131.50 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        323.52     13.15         4.942       169.30
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2113.00 =  4767.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1       341.51      10.44         5.734
    2       396.42      13.15         4.942

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    396.42   Tc(MIN.) =   13.15
 TOTAL AREA(ACRES) =    194.00

****************************************************************************
 FLOW PROCESS FROM NODE   2113.00 TO NODE   2113.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   2113.00 TO NODE   2158.00 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) =   311.50
  FLOW LENGTH(FEET) =   447.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.00
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    396.42
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =  13.42
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2158.00 =  5214.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2158.00 TO NODE   2158.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   2159.00 TO NODE   2160.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  80
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    62.00
  UPSTREAM ELEVATION(FEET) =    337.00
  DOWNSTREAM ELEVATION(FEET) =    336.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.064
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.283
  SUBAREA RUNOFF(CFS) =      0.66
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.66

****************************************************************************
  FLOW PROCESS FROM NODE   2160.00 TO NODE   2161.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    336.00  DOWNSTREAM(FEET) =    328.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   656.00   CHANNEL SLOPE =  0.0122
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.719
  LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  80
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.16
  AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   5.06
  Tc(MIN.) =  14.13
  SUBAREA AREA(ACRES) =     4.00       SUBAREA RUNOFF(CFS) =    6.61
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      4.30         PEAK FLOW RATE(CFS) =       7.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   2.57
  LONGEST FLOWPATH FROM NODE   2159.00 TO NODE   2161.00 =   718.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2161.00 TO NODE   2162.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   313.00
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.10
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  14.23
  LONGEST FLOWPATH FROM NODE   2159.00 TO NODE   2162.00 =   801.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2162.00 TO NODE   2162.00 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.) =  14.23
  RAINFALL INTENSITY(INCH/HR) =   4.70
  TOTAL STREAM AREA(ACRES) =     4.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.10

****************************************************************************
  FLOW PROCESS FROM NODE   2163.00 TO NODE   2163.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    349.00
  DOWNSTREAM ELEVATION(FEET) =    347.30
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.577
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE   2163.10 TO NODE   2164.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  347.30  DOWNSTREAM ELEVATION(FEET) =  340.00
  STREET LENGTH(FEET) =   301.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =   4.12
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    4.01
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       4.81

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.92
 FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
 LONGEST FLOWPATH FROM NODE   2163.00 TO NODE   2164.00 =   371.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2164.00 TO NODE   2162.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  340.00  DOWNSTREAM ELEVATION(FEET) =  319.00
 STREET LENGTH(FEET) =   627.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =      11.50
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.42
   HALFSTREET FLOOD WIDTH(FEET) =   14.62
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.10
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.13
 STREET FLOW TRAVEL TIME(MIN.) =   2.05   Tc(MIN.) =   6.17
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.052
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =   13.31
 TOTAL AREA(ACRES) =      2.50        PEAK FLOW RATE(CFS) =      17.51

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.26
 FLOW VELOCITY(FEET/SEC.) =  5.65   DEPTH*VELOCITY(FT*FT/SEC.) =   2.67
 LONGEST FLOWPATH FROM NODE   2163.00 TO NODE   2162.00 =   998.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2162.00 TO NODE   2162.00 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.) =   6.17
 RAINFALL INTENSITY(INCH/HR) =   8.05
 TOTAL STREAM AREA(ACRES) =     2.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.51

 ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc       INTENSITY       AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         7.10     14.23         4.697          4.30
     2        17.51      6.17         8.052          2.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1        20.59      6.17         8.052
     2        17.32     14.23         4.697

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     20.59   Tc(MIN.) =    6.17
  TOTAL AREA(ACRES) =      6.80
  LONGEST FLOWPATH FROM NODE   2163.00 TO NODE   2162.00 =   998.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2162.00 TO NODE   2158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   313.00  DOWNSTREAM(FEET) =   311.50
  FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.81
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     20.59
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   6.24
  LONGEST FLOWPATH FROM NODE   2163.00 TO NODE   2158.00 =  1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2158.00 TO NODE   2158.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        20.59      6.24         7.991         6.80
  LONGEST FLOWPATH FROM NODE   2163.00 TO NODE   2158.00 =  1050.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1       396.42     13.42         4.879       194.00
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2158.00 =  5214.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       205.06      6.24         7.991
     2       409.00     13.42         4.879

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    409.00   Tc(MIN.) =   13.42
  TOTAL AREA(ACRES) =    200.80

****************************************************************************
  FLOW PROCESS FROM NODE   2158.00 TO NODE   2158.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   2158.00 TO NODE    258.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   311.50  DOWNSTREAM(FEET) =   311.00
 FLOW LENGTH(FEET) =    88.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  81.0 INCH PIPE IS  65.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.21
 ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    409.00
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  13.53
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    258.00 =  5302.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1      409.00    13.53        4.853       200.80
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE    258.00 =  5302.30 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1      147.35    10.25        5.805        33.00
 LONGEST FLOWPATH FROM NODE    241.00 TO NODE    258.00 =  4120.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1     457.18       10.25        5.805
    2     532.18       13.53        4.853

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    532.18   Tc(MIN.) =   13.53
 TOTAL AREA(ACRES) =    233.80

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE   2165.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   311.00  DOWNSTREAM(FEET) =   306.00
 FLOW LENGTH(FEET) =   552.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  84.0 INCH PIPE IS  63.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.01
 ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    532.18
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =  14.07
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2165.00 =  5854.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2165.00 TO NODE   2165.00 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.) =  14.07
  RAINFALL INTENSITY(INCH/HR) =   4.73
  TOTAL STREAM AREA(ACRES) =   233.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    532.18

****************************************************************************
  FLOW PROCESS FROM NODE   2166.00 TO NODE   2167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    324.00
  DOWNSTREAM ELEVATION(FEET) =    323.30
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.708
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE   2167.00 TO NODE   2168.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    323.30  DOWNSTREAM(FEET) =    313.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   582.00   CHANNEL SLOPE =  0.0177
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.915
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.22
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   1.56
  Tc(MIN.) =   5.27
  SUBAREA AREA(ACRES) =     3.90       SUBAREA RUNOFF(CFS) =   28.51
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =      4.00         PEAK FLOW RATE(CFS) =      29.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   7.52
  LONGEST FLOWPATH FROM NODE   2166.00 TO NODE   2168.00 =   642.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2168.00 TO NODE   2165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   308.00  DOWNSTREAM(FEET) =   306.00
  FLOW LENGTH(FEET) =   124.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.39
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     29.24
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   5.47
  LONGEST FLOWPATH FROM NODE   2166.00 TO NODE   2165.00 =   766.00 FEET.

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

```
 FLOW PROCESS FROM NODE   2165.00 TO NODE   2165.00 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.) =   5.47
 RAINFALL INTENSITY(INCH/HR) =   8.70
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.24

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       532.18    14.07        4.732        233.80
    2        29.24     5.47        8.705          4.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       236.07     5.47        8.705
    2       548.08    14.07        4.732

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    548.08   Tc(MIN.) =   14.07
 TOTAL AREA(ACRES) =    237.80
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2165.00 =  5854.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2165.00 TO NODE   2169.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   306.00  DOWNSTREAM(FEET) =   303.20
 FLOW LENGTH(FEET) =   372.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  87.0 INCH PIPE IS  67.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.91
 ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    548.08
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =  14.46
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2169.00 =  6226.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2169.00 TO NODE   2169.00 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.) =  14.46
 RAINFALL INTENSITY(INCH/HR) =   4.65
 TOTAL STREAM AREA(ACRES) =   237.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    548.08

****************************************************************************
 FLOW PROCESS FROM NODE   2170.00 TO NODE   2170.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
```

```
  UPSTREAM ELEVATION(FEET) =    335.80
  DOWNSTREAM ELEVATION(FEET) =    332.70
  ELEVATION DIFFERENCE(FEET) =      3.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.358
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE   2170.10 TO NODE   2171.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  332.70  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.73
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =   4.08
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    3.21
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       4.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.14
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.30
  LONGEST FLOWPATH FROM NODE   2170.00 TO NODE   2171.00 =   465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2171.00 TO NODE   2172.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  318.00  DOWNSTREAM ELEVATION(FEET) =  308.80
  STREET LENGTH(FEET) =   921.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       8.13
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.45
  HALFSTREET FLOOD WIDTH(FEET) =   16.20
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.97
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
 STREET FLOW TRAVEL TIME(MIN.) =   5.17   Tc(MIN.) =   9.25
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.201
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =     1.50      SUBAREA RUNOFF(CFS) =     8.09
 TOTAL AREA(ACRES) =      2.00        PEAK FLOW RATE(CFS) =      10.79

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.00
 FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
 LONGEST FLOWPATH FROM NODE   2170.00 TO NODE   2172.00 =  1386.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2172.00 TO NODE   2169.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   304.00  DOWNSTREAM(FEET) =   303.20
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.79
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   9.45
 LONGEST FLOWPATH FROM NODE   2170.00 TO NODE   2169.00 =  1466.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2169.00 TO NODE   2169.00 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.) =   9.45
 RAINFALL INTENSITY(INCH/HR) =   6.12
 TOTAL STREAM AREA(ACRES) =     2.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.79

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1      548.08    14.46        4.649        237.80
    2       10.79     9.45        6.117          2.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1      427.30     9.45        6.117
    2      556.28    14.46        4.649

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    556.28   Tc(MIN.) =   14.46
 TOTAL AREA(ACRES) =    239.80
 LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2169.00 =  6226.30 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   2169.00 TO NODE   2174.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   303.20  DOWNSTREAM(FEET) =   299.72
  FLOW LENGTH(FEET) =   348.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  84.0 INCH PIPE IS  63.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.86
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    556.28
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =  14.78
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2174.00 =  6574.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2174.00 TO NODE   2174.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   2175.00 TO NODE   2176.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    356.00
  DOWNSTREAM ELEVATION(FEET) =    354.10
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.672
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.502
  SUBAREA RUNOFF(CFS) =      0.54
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.54

****************************************************************************
  FLOW PROCESS FROM NODE   2176.00 TO NODE   2177.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.10  DOWNSTREAM(FEET) =    333.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1061.00   CHANNEL SLOPE =  0.0199
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.172
  RESIDENTAIL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     43.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.33
  AVERAGE FLOW DEPTH(FEET) =   1.03   TRAVEL TIME(MIN.) =   1.71
  Tc(MIN.) =   7.38
  SUBAREA AREA(ACRES) =    18.90       SUBAREA RUNOFF(CFS) =   85.39
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.630
  TOTAL AREA(ACRES) =     19.00         PEAK FLOW RATE(CFS) =      85.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.43   FLOW VELOCITY(FEET/SEC.) =  12.33
  LONGEST FLOWPATH FROM NODE   2175.00 TO NODE   2177.00 =  1141.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2177.00 TO NODE   2178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   328.00  DOWNSTREAM(FEET) =   302.00
 FLOW LENGTH(FEET) =   291.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.17
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     85.85
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   7.58
 LONGEST FLOWPATH FROM NODE   2175.00 TO NODE   2178.00 =  1432.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2178.00 TO NODE   2178.00 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.) =   7.58
 RAINFALL INTENSITY(INCH/HR) =   7.05
 TOTAL STREAM AREA(ACRES) =    19.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     85.85

****************************************************************************
 FLOW PROCESS FROM NODE  21781.00 TO NODE   2179.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    316.00
 DOWNSTREAM ELEVATION(FEET) =    315.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.293
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE   2179.00 TO NODE   2180.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    315.00  DOWNSTREAM(FEET) =    308.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   488.00   CHANNEL SLOPE =  0.0143
 CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.37
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.02
 AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   1.35
 Tc(MIN.) =   4.64
 SUBAREA AREA(ACRES) =     3.60       SUBAREA RUNOFF(CFS) =   27.22
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
 TOTAL AREA(ACRES) =      3.70         PEAK FLOW RATE(CFS) =      27.98

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   7.19
 LONGEST FLOWPATH FROM NODE  21781.00 TO NODE   2180.00 =   548.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   2180.00 TO NODE   2178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   303.00  DOWNSTREAM(FEET) =   302.00
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.04
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     27.98
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   4.80
  LONGEST FLOWPATH FROM NODE  21781.00 TO NODE   2178.00 =   633.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2178.00 TO NODE   2178.00 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.) =   4.80
  RAINFALL INTENSITY(INCH/HR) =   9.22
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.98

****************************************************************************
  FLOW PROCESS FROM NODE  13010.00 TO NODE  13010.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  12.68   RAIN INTENSITY(INCH/HOUR) =  5.06
  TOTAL AREA(ACRES) =    79.20   TOTAL RUNOFF(CFS) =    140.24

****************************************************************************
  FLOW PROCESS FROM NODE  13010.00 TO NODE  13011.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    310.00  DOWNSTREAM(FEET) =    309.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.0100
  CHANNEL FLOW THRU SUBAREA(CFS) =    140.24
  FLOW VELOCITY(FEET/SEC) =   5.26
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =  12.84
  LONGEST FLOWPATH FROM NODE   2153.00 TO NODE  13011.00 =   943.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE  13011.00 TO NODE   2178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   303.00  DOWNSTREAM(FEET) =   302.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.73
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    140.24
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =  12.97
  LONGEST FLOWPATH FROM NODE   2153.00 TO NODE   2178.00 =  1043.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2178.00 TO NODE   2178.00 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.) =  12.97
  RAINFALL INTENSITY(INCH/HR) =   4.99
  TOTAL STREAM AREA(ACRES) =    79.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    140.24

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY       AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       85.85      7.58         7.054         19.00
      2       27.98      4.80         9.222          3.70
      3      140.24     12.97         4.987         79.20

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1      134.27      4.80         9.222
      2      189.16      7.58         7.054
      3      216.06     12.97         4.987

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    216.06   Tc(MIN.) =   12.97
  TOTAL AREA(ACRES) =    101.90
  LONGEST FLOWPATH FROM NODE   2175.00 TO NODE   2178.00 =  1432.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2178.00 TO NODE   2174.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   302.00  DOWNSTREAM(FEET) =   299.72
  FLOW LENGTH(FEET) =   124.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  41.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.45
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    216.06
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  13.09
  LONGEST FLOWPATH FROM NODE   2175.00 TO NODE   2174.00 =  1556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2174.00 TO NODE   2174.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1      216.06     13.09         4.957       101.90
  LONGEST FLOWPATH FROM NODE   2175.00 TO NODE   2174.00 =  1556.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1      556.28     14.78         4.583       239.80
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2174.00 =  6574.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1      708.54     13.09         4.957
```

```
     2     756.01      14.78        4.583

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    756.01   Tc(MIN.) =   14.78
  TOTAL AREA(ACRES) =    341.70

****************************************************************************
  FLOW PROCESS FROM NODE   2174.00 TO NODE   2174.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   2174.00 TO NODE   2181.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   299.72  DOWNSTREAM(FEET) =   292.20
  FLOW LENGTH(FEET) =   748.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  93.0 INCH PIPE IS  72.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.23
  ESTIMATED PIPE DIAMETER(INCH) =  93.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    756.01
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =  15.43
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2181.00 =  7322.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2181.00 TO NODE   2181.00 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.) =  15.43
  RAINFALL INTENSITY(INCH/HR) =   4.46
  TOTAL STREAM AREA(ACRES) =   341.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    756.01

****************************************************************************
  FLOW PROCESS FROM NODE   2182.00 TO NODE   2183.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTAIL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    322.00
  DOWNSTREAM ELEVATION(FEET) =    320.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.556
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE   2183.00 TO NODE   2184.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    320.50  DOWNSTREAM(FEET) =    308.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   936.00   CHANNEL SLOPE =  0.0134
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.429
```

```
  RESIDENTAIL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.41
  AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   2.44
  Tc(MIN.) =   6.99
  SUBAREA AREA(ACRES) =     4.50       SUBAREA RUNOFF(CFS) =   23.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  TOTAL AREA(ACRES) =      4.60         PEAK FLOW RATE(CFS) =      24.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   7.62
  LONGEST FLOWPATH FROM NODE   2182.00 TO NODE   2184.00 =  1006.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2184.00 TO NODE   2181.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   303.00  DOWNSTREAM(FEET) =   292.20
  FLOW LENGTH(FEET) =   124.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.59
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     24.26
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   7.10
  LONGEST FLOWPATH FROM NODE   2182.00 TO NODE   2181.00 =  1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2181.00 TO NODE   2181.00 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.) =   7.10
  RAINFALL INTENSITY(INCH/HR) =   7.35
  TOTAL STREAM AREA(ACRES) =     4.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.26

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      756.01    15.43        4.458        341.70
      2       24.26     7.10        7.354          4.60

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      372.20     7.10       7.354
      2      770.72    15.43       4.458

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    770.72   Tc(MIN.) =   15.43
  TOTAL AREA(ACRES) =    346.30
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2181.00 =  7322.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2181.00 TO NODE   2185.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   292.20  DOWNSTREAM(FEET) =   288.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  72.0 INCH PIPE IS  55.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.10
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    770.72
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  15.48
  LONGEST FLOWPATH FROM NODE   2601.00 TO NODE   2185.00 =  7422.30 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =    346.30  TC(MIN.) =     15.48
  PEAK FLOW RATE(CFS)   =    770.72
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 6D:
BASIN 500

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2004 Advanced Engineering Software (aes)
              Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                              Analysis prepared by:

                                LANDMARK CONSULTING
                           9555 GENESEE AVENUE, SUITE 200
                                SAN DEIGO, CA 92121
                                 TEL:  858-587-8070

 ************************** DESCRIPTION OF STUDY **************************
* CAMPUS PARK, BASIN 500                                                  *
* POST-DEVELOPMENT CONDITIONS                                             *
* 100-YEAR STORM                                                          *
 **************************************************************************

  FILE NAME: 614P5C.DAT
  TIME/DATE OF STUDY: 16:03 02/28/2009
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    508.00 TO NODE    508.10 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    285.00
  DOWNSTREAM ELEVATION(FEET) =    284.55
  ELEVATION DIFFERENCE(FEET) =      0.45
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.032
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

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

```
 FLOW PROCESS FROM NODE    508.10 TO NODE    507.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  284.55  DOWNSTREAM ELEVATION(FEET) =  274.50
 STREET LENGTH(FEET) =  1116.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       8.38
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.46
   HALFSTREET FLOOD WIDTH(FEET) =   16.71
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
 STREET FLOW TRAVEL TIME(MIN.) =   6.46   Tc(MIN.) =   9.49
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.099
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =   14.86
 TOTAL AREA(ACRES) =      2.90        PEAK FLOW RATE(CFS) =      15.39

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.00
 FLOW VELOCITY(FEET/SEC.) =  3.01   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
 LONGEST FLOWPATH FROM NODE    508.00 TO NODE    507.00 =  1166.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    507.00 TO NODE    507.00 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.) =   9.49
 RAINFALL INTENSITY(INCH/HR) =   6.10
 TOTAL STREAM AREA(ACRES) =     2.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.39

****************************************************************************
 FLOW PROCESS FROM NODE  20003.00 TO NODE  20003.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  11.57   RAIN INTENSITY(INCH/HOUR) =  5.37
 TOTAL AREA(ACRES) =    20.80   TOTAL RUNOFF(CFS) =     39.07

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM ANALYSIS IN SECTION 4                             |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE  20003.00 TO NODE    507.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   269.60  DOWNSTREAM(FEET) =   269.00
  FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     39.07
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =  11.64
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    507.00 =    42.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    507.00 TO NODE    507.00 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.) =  11.64
  RAINFALL INTENSITY(INCH/HR) =   5.35
  TOTAL STREAM AREA(ACRES) =    20.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     39.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       15.39     9.49        6.099         2.90
      2       39.07    11.64        5.348        20.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       47.26     9.49        6.099
      2       52.56    11.64        5.348

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     52.56   Tc(MIN.) =   11.64
  TOTAL AREA(ACRES) =     23.70
  LONGEST FLOWPATH FROM NODE    508.00 TO NODE    507.00 =  1166.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    507.00 TO NODE    509.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   269.00  DOWNSTREAM(FEET) =   268.20
  FLOW LENGTH(FEET) =    76.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.23
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     52.56
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  11.76
  LONGEST FLOWPATH FROM NODE    508.00 TO NODE    509.00 =  1242.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    509.00 TO NODE    509.00 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.) =  11.76
```

```
 RAINFALL INTENSITY(INCH/HR) =   5.31
 TOTAL STREAM AREA(ACRES) =    23.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     52.56

****************************************************************************
 FLOW PROCESS FROM NODE    510.00 TO NODE    510.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    285.00
 DOWNSTREAM ELEVATION(FEET) =    284.55
 ELEVATION DIFFERENCE(FEET) =      0.45
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.032
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    510.10 TO NODE    509.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  284.55  DOWNSTREAM ELEVATION(FEET) =  274.50
 STREET LENGTH(FEET) =  1115.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       5.27
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.40
   HALFSTREET FLOOD WIDTH(FEET) =   13.91
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
 STREET FLOW TRAVEL TIME(MIN.) =   7.24   Tc(MIN.) =  10.28
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.795
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    8.57
 TOTAL AREA(ACRES) =      1.80        PEAK FLOW RATE(CFS) =       9.07

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.26
 FLOW VELOCITY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
 LONGEST FLOWPATH FROM NODE    510.00 TO NODE    509.00 =  1165.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    509.00 TO NODE    509.00 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.) =  10.28
  RAINFALL INTENSITY(INCH/HR) =   5.79
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY       AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1       52.56     11.76         5.312         23.70
      2        9.07     10.28         5.795          1.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       57.26     10.28         5.795
      2       60.88     11.76         5.312

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     60.88   Tc(MIN.) =   11.76
  TOTAL AREA(ACRES) =     25.50
  LONGEST FLOWPATH FROM NODE    508.00 TO NODE    509.00 =  1242.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    509.00 TO NODE    511.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   268.20  DOWNSTREAM(FEET) =   267.90
  FLOW LENGTH(FEET) =   152.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     60.88
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =  12.21
  LONGEST FLOWPATH FROM NODE    508.00 TO NODE    511.00 =  1394.00 FEET.

+--------------------------------------------------------------------------+
| FLOW DISCHARGES ONTO EXISTING NATURAL TERRAIN                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      25.50  TC(MIN.) =      12.21
  PEAK FLOW RATE(CFS)    =      60.88
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 6E:
BASIN 300

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2004 Advanced Engineering Software (aes)
            Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                          Analysis prepared by:

                            LANDMARK CONSULTING
                       9555 GENESEE AVENUE, SUITE 200
                            SAN DEIGO, CA 92121
                             TEL:  858-587-8070

 ************************* DESCRIPTION OF STUDY *************************
* CAMPUS PARK, BASIN 300                                                *
* POST-DEVELOPMENT CONDITIONS                                           *
* 100-YEAR STORM                                                        *
 ************************************************************************

  FILE NAME: 614P3C.DAT
  TIME/DATE OF STUDY: 16:15 05/06/2009
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE   2181.00 TO NODE   2181.00 IS CODE =   7
------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  15.48   RAIN INTENSITY(INCH/HOUR) =  4.45
  TOTAL AREA(ACRES) =   346.30   TOTAL RUNOFF(CFS) =    770.72

+----------------------------------------------------------------------+
| DATA PER BSIN 200 ANALYSIS IN THIS REPORT                            |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE   2181.00 TO NODE    301.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   298.00  DOWNSTREAM(FEET) =   294.88
  FLOW LENGTH(FEET) =   311.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  93.0 INCH PIPE IS  73.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.22
  ESTIMATED PIPE DIAMETER(INCH) =  93.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    770.72
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =  15.75
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    301.00 =   311.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 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.) =  15.75
  RAINFALL INTENSITY(INCH/HR) =   4.40
  TOTAL STREAM AREA(ACRES) =   346.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    770.72

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    312.70
  DOWNSTREAM ELEVATION(FEET) =    312.10
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.207
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  312.10  DOWNSTREAM ELEVATION(FEET) =  303.60
  STREET LENGTH(FEET) =   996.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       9.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   5.69   Tc(MIN.) =   8.89
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.361
```

```
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     3.20      SUBAREA RUNOFF(CFS) =   17.71
  TOTAL AREA(ACRES) =       3.30        PEAK FLOW RATE(CFS) =      18.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  996.0 FT WITH ELEVATION-DROP =   8.5 FT, IS   25.7 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    304.00
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    304.00 =  1056.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    301.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   298.10  DOWNSTREAM(FEET) =   294.88
  FLOW LENGTH(FEET) =    76.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.12
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     18.26
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   8.99
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    301.00 =  1132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 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.) =   8.99
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     3.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.26

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      770.72    15.75        4.399        346.30
      2       18.26     8.99        6.317          3.30

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      458.14     8.99       6.317
      2      783.44    15.75       4.399

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    783.44   Tc(MIN.) =   15.75
  TOTAL AREA(ACRES) =    349.60
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    301.00 =  1132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   294.88  DOWNSTREAM(FEET) =   291.90
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  93.0 INCH PIPE IS  74.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.47
  ESTIMATED PIPE DIAMETER(INCH) =  93.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    783.44
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =  16.00
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    305.00 =  1422.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =  16.00
  RAINFALL INTENSITY(INCH/HR) =   4.36
  TOTAL STREAM AREA(ACRES) =   349.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    783.44

****************************************************************************
  FLOW PROCESS FROM NODE  15002.00 TO NODE  15002.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   9.71   RAIN INTENSITY(INCH/HOUR) =  6.01
  TOTAL AREA(ACRES) =     4.80   TOTAL RUNOFF(CFS) =     10.10

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM ANALYSIS IN SECION 4 OF THIS REPORT               |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  15002.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   302.00  DOWNSTREAM(FEET) =   291.90
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     10.10
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.80
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    305.00 =  1222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   9.80
  RAINFALL INTENSITY(INCH/HR) =   5.97
  TOTAL STREAM AREA(ACRES) =     4.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
```

```
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)     (ACRE)
     1       783.44     16.00        4.355         349.60
     2        10.10      9.80        5.974           4.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       581.23     9.80        5.974
     2       790.80    16.00        4.355

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    790.80   Tc(MIN.) =   16.00
 TOTAL AREA(ACRES) =    354.40
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    305.00 =  1422.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   291.90  DOWNSTREAM(FEET) =   285.80
 FLOW LENGTH(FEET) =   610.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  93.0 INCH PIPE IS  75.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.21
 ESTIMATED PIPE DIAMETER(INCH) =  93.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    790.80
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =  16.53
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    306.00 =  2032.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 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.) =  16.53
 RAINFALL INTENSITY(INCH/HR) =   4.26
 TOTAL STREAM AREA(ACRES) =   354.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    790.80

****************************************************************************
 FLOW PROCESS FROM NODE  16002.00 TO NODE  16002.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   9.19   RAIN INTENSITY(INCH/HOUR) =  6.23
 TOTAL AREA(ACRES) =     4.20   TOTAL RUNOFF(CFS) =      9.15

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM ANALYSIS IN SECTION 4                             |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE  16002.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   304.00  DOWNSTREAM(FEET) =   285.80
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
```

```
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.18
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.15
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.28
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    306.00 =  1322.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 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.) =   9.28
 RAINFALL INTENSITY(INCH/HR) =   6.19
 TOTAL STREAM AREA(ACRES) =     4.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.15

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1       790.80    16.53        4.265        354.40
    2         9.15     9.28        6.190          4.20

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)
    1       554.03     9.28       6.190
    2       797.11    16.53       4.265

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    797.11   Tc(MIN.) =   16.53
 TOTAL AREA(ACRES) =    358.60
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    306.00 =  2032.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   285.80  DOWNSTREAM(FEET) =   283.50
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  90.0 INCH PIPE IS  73.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.68
 ESTIMATED PIPE DIAMETER(INCH) =  90.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    797.11
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  16.68
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    307.00 =  2222.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 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.) =  16.68
 RAINFALL INTENSITY(INCH/HR) =   4.24
 TOTAL STREAM AREA(ACRES) =   358.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    797.11
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    308.00 TO NODE    309.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    300.00
 DOWNSTREAM ELEVATION(FEET) =    299.10
 ELEVATION DIFFERENCE(FEET) =      0.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.801
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    309.00 TO NODE    307.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  299.10  DOWNSTREAM ELEVATION(FEET) =  291.00
 STREET LENGTH(FEET) =   641.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.10
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =   10.41
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
 STREET FLOW TRAVEL TIME(MIN.) =   4.14   Tc(MIN.) =   6.94
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.465
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    4.55
 TOTAL AREA(ACRES) =      0.80        PEAK FLOW RATE(CFS) =       5.20

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.90
 FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
 LONGEST FLOWPATH FROM NODE    308.00 TO NODE    307.00 =   701.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 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.) =   6.94
 RAINFALL INTENSITY(INCH/HR) =   7.47
 TOTAL STREAM AREA(ACRES) =     0.80
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.20

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1       797.11     16.68         4.239         358.60
      2         5.20      6.94         7.465           0.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1       457.86      6.94        7.465
      2       800.06     16.68        4.239

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    800.06   Tc(MIN.) =   16.68
  TOTAL AREA(ACRES) =    359.40
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    307.00 =  2222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   283.10  DOWNSTREAM(FEET) =   281.90
  FLOW LENGTH(FEET) =   117.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  93.0 INCH PIPE IS  75.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.43
  ESTIMATED PIPE DIAMETER(INCH) =  93.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    800.06
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  16.78
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    311.00 =  2339.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 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.) =  16.78
  RAINFALL INTENSITY(INCH/HR) =   4.22
  TOTAL STREAM AREA(ACRES) =   359.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    800.06

****************************************************************************
  FLOW PROCESS FROM NODE  17002.00 TO NODE  17002.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.36   RAIN INTENSITY(INCH/HOUR) =  5.76
  TOTAL AREA(ACRES) =     2.00   TOTAL RUNOFF(CFS) =      4.04

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM ANALYSIS IN SECTION 4                             |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  17002.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   306.00  DOWNSTREAM(FEET) =   281.90
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.04
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  10.48
  LONGEST FLOWPATH FROM NODE    308.00 TO NODE    311.00 =   813.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 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.) =  10.48
  RAINFALL INTENSITY(INCH/HR) =   5.72
  TOTAL STREAM AREA(ACRES) =     2.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.04

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      800.06    16.78        4.223        359.40
      2        4.04    10.48        5.723          2.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      594.42    10.48       5.723
      2      803.04    16.78       4.223

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    803.04   Tc(MIN.) =   16.78
  TOTAL AREA(ACRES) =    361.40
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    311.00 =  2339.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   281.90  DOWNSTREAM(FEET) =   275.50
  FLOW LENGTH(FEET) =   544.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  93.0 INCH PIPE IS  71.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.75
  ESTIMATED PIPE DIAMETER(INCH) =  93.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    803.04
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =  17.22
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    312.00 =  2884.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 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.) =  17.22
```

```
 RAINFALL INTENSITY(INCH/HR) =   4.15
 TOTAL STREAM AREA(ACRES) =   361.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    803.04

****************************************************************************
 FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    291.20
 DOWNSTREAM ELEVATION(FEET) =    289.80
 ELEVATION DIFFERENCE(FEET) =      1.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.418
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  289.80  DOWNSTREAM ELEVATION(FEET) =  284.00
 STREET LENGTH(FEET) =   566.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.75
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.39
   HALFSTREET FLOOD WIDTH(FEET) =   13.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.63
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
 STREET FLOW TRAVEL TIME(MIN.) =   3.59   Tc(MIN.) =   6.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.195
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =     1.10      SUBAREA RUNOFF(CFS) =     7.84
 TOTAL AREA(ACRES) =      1.20        PEAK FLOW RATE(CFS) =       8.56

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.45
 FLOW VELOCITY(FEET/SEC.) =  3.03   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
 LONGEST FLOWPATH FROM NODE    313.00 TO NODE    315.00 =   626.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    315.00 TO NODE    312.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   278.00  DOWNSTREAM(FEET) =   275.50
```

```
 FLOW LENGTH(FEET) =    74.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      8.56
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   6.13
 LONGEST FLOWPATH FROM NODE    313.00 TO NODE    312.00 =   700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 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.) =   6.13
 RAINFALL INTENSITY(INCH/HR) =   8.09
 TOTAL STREAM AREA(ACRES) =     1.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.56

****************************************************************************
 FLOW PROCESS FROM NODE    316.00 TO NODE    317.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    291.20
 DOWNSTREAM ELEVATION(FEET) =    289.00
 ELEVATION DIFFERENCE(FEET) =      2.20
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.365
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    317.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  289.00  DOWNSTREAM ELEVATION(FEET) =  284.00
 STREET LENGTH(FEET) =   566.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.19
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   11.37
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.26
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
 STREET FLOW TRAVEL TIME(MIN.) =   4.17   Tc(MIN.) =   6.54
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.757
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.70     SUBAREA RUNOFF(CFS) =     4.72
  TOTAL AREA(ACRES) =      0.80      PEAK FLOW RATE(CFS) =       5.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.12
  FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE    316.00 TO NODE    312.00 =   636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 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.) =   6.54
  RAINFALL INTENSITY(INCH/HR) =   7.76
  TOTAL STREAM AREA(ACRES) =     0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      803.04    17.22        4.154        361.40
      2        8.56     6.13        8.090          1.20
      3        5.40     6.54        7.757          0.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      425.91     6.13       8.090
      2      443.60     6.54       7.757
      3      810.32    17.22       4.154

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    810.32   Tc(MIN.) =   17.22
  TOTAL AREA(ACRES) =    363.40
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    312.00 =  2884.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    318.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   275.10  DOWNSTREAM(FEET) =   269.50
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  45.16
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    810.32
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  17.24
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    318.00 =  2944.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    318.00 TO NODE    318.00 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.) =  17.24
```

```
 RAINFALL INTENSITY(INCH/HR) =   4.15
 TOTAL STREAM AREA(ACRES) =   363.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    810.32

****************************************************************************
 FLOW PROCESS FROM NODE    319.00 TO NODE    320.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    300.00
 DOWNSTREAM ELEVATION(FEET) =    299.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.903
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      3.27
 TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      3.27

****************************************************************************
 FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    299.00  DOWNSTREAM(FEET) =    287.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1417.00   CHANNEL SLOPE =  0.0085
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.821
 RESIDENTAIL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     25.00
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.46
 AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   5.30
 Tc(MIN.) =  10.20
 SUBAREA AREA(ACRES) =    10.20       SUBAREA RUNOFF(CFS) =   42.16
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 TOTAL AREA(ACRES) =     10.70         PEAK FLOW RATE(CFS) =      44.22

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.85   FLOW VELOCITY(FEET/SEC.) =   5.10
 LONGEST FLOWPATH FROM NODE    319.00 TO NODE    321.00 =  1482.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    321.00 TO NODE    318.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   281.00  DOWNSTREAM(FEET) =   269.50
 FLOW LENGTH(FEET) =   118.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.19
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     44.22
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  10.29
 LONGEST FLOWPATH FROM NODE    319.00 TO NODE    318.00 =  1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    318.00 TO NODE    318.00 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.) =  10.29
  RAINFALL INTENSITY(INCH/HR) =   5.79
  TOTAL STREAM AREA(ACRES) =    10.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     44.22

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      810.32    17.24        4.150        363.40
      2       44.22    10.29        5.789         10.70

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      625.14    10.29       5.789
      2      842.03    17.24       4.150

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    842.03   Tc(MIN.) =   17.24
  TOTAL AREA(ACRES) =    374.10
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    318.00 =  2944.20 FEET.

+----------------------------------------------------------------------------+
| FLOW ENTERS PROPOSED DETENTION BASIN                                       |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    318.00 TO NODE    322.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    269.50  DOWNSTREAM(FEET) =    263.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0125
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.992
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    843.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.10
  AVERAGE FLOW DEPTH(FEET) =   1.93   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =  18.31
  SUBAREA AREA(ACRES) =     2.20       SUBAREA RUNOFF(CFS) =    3.07
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.507
  TOTAL AREA(ACRES) =    376.30         PEAK FLOW RATE(CFS) =     842.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.93   FLOW VELOCITY(FEET/SEC.) =   8.11
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    322.00 =  3464.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    323.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   263.00  DOWNSTREAM(FEET) =   262.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  96.0 INCH PIPE IS  76.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.62
  ESTIMATED PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    842.03
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  18.34
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    323.00 =  3494.20 FEET.

+----------------------------------------------------------------------------+
| FLOW ENTERS HORSE RANCH CREEK FLOOD PLAIN                                  |
| SEE PONDPACK ANALYSIS                                                      |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  18009.00 TO NODE  18009.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  14.10   RAIN INTENSITY(INCH/HOUR) =  4.72
  TOTAL AREA(ACRES) =   102.80   TOTAL RUNOFF(CFS) =    169.97

+----------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM ANALYSIS IN SECTION 4                               |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  18009.00 TO NODE    324.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   274.00  DOWNSTREAM(FEET) =   271.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.38
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    169.97
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  14.27
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    324.00 =  3664.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    345.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    271.00  DOWNSTREAM(FEET) =    264.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0113
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.205
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    172.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.94
  AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   2.62
  Tc(MIN.) =  16.90
  SUBAREA AREA(ACRES) =     4.00       SUBAREA RUNOFF(CFS) =    5.89
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =    106.80         PEAK FLOW RATE(CFS) =     169.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   3.92
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    345.00 =  4284.20 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    345.00 TO NODE    345.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE  19003.00 TO NODE  19003.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   9.86   RAIN INTENSITY(INCH/HOUR) =  5.95
  TOTAL AREA(ACRES) =    12.70   TOTAL RUNOFF(CFS) =     31.03

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM ANALYSIS IN SECTION 4                             |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  19003.00 TO NODE    338.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   278.00  DOWNSTREAM(FEET) =   269.00
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     31.03
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.91
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    338.00 =  4357.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 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.) =   9.91
  RAINFALL INTENSITY(INCH/HR) =   5.93
  TOTAL STREAM AREA(ACRES) =    12.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.03

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    340.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    284.40
  DOWNSTREAM ELEVATION(FEET) =    283.80
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.755
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

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

```
 FLOW PROCESS FROM NODE    340.00 TO NODE    338.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  283.80  DOWNSTREAM ELEVATION(FEET) =  276.40
 STREET LENGTH(FEET) =   170.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =      15.64
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.44
   HALFSTREET FLOOD WIDTH(FEET) =   15.69
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.06
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.67
 STREET FLOW TRAVEL TIME(MIN.) =   0.47   Tc(MIN.) =   3.22
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =   29.68
 TOTAL AREA(ACRES) =      3.80        PEAK FLOW RATE(CFS) =      30.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.00
 FLOW VELOCITY(FEET/SEC.) =  6.62   DEPTH*VELOCITY(FT*FT/SEC.) =   3.22
 LONGEST FLOWPATH FROM NODE    339.00 TO NODE    338.00 =   220.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 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.) =   3.22
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     3.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.49

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       31.03     9.91        5.930         12.70
    2       30.49     3.22        9.222          3.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       40.57     3.22        9.222
    2       50.63     9.91        5.930

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
 PEAK FLOW RATE(CFS) =     50.63   Tc(MIN.) =    9.91
 TOTAL AREA(ACRES) =     16.50
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    338.00 =  4357.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    341.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   269.00  DOWNSTREAM(FEET) =   268.20
 FLOW LENGTH(FEET) =    78.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     50.63
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =  10.05
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    341.00 =  4435.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    341.00 TO NODE    341.00 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.) =  10.05
 RAINFALL INTENSITY(INCH/HR) =   5.88
 TOTAL STREAM AREA(ACRES) =    16.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     50.63

****************************************************************************
 FLOW PROCESS FROM NODE    342.00 TO NODE    343.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    284.40
 DOWNSTREAM ELEVATION(FEET) =    283.80
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.755
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    343.00 TO NODE    341.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  283.80  DOWNSTREAM ELEVATION(FEET) =  276.40
 STREET LENGTH(FEET) =   170.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       8.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =   3.30
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =   14.44
  TOTAL AREA(ACRES) =      1.90        PEAK FLOW RATE(CFS) =      15.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.54
  FLOW VELOCITY(FEET/SEC.) =  6.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.63
  LONGEST FLOWPATH FROM NODE    342.00 TO NODE    341.00 =   220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    341.00 TO NODE    341.00 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.) =   3.30
  RAINFALL INTENSITY(INCH/HR) =   9.22
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.24

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       50.63    10.05        5.880         16.50
      2       15.24     3.30        9.222          1.90

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       47.53     3.30       9.222
      2       60.35    10.05       5.880

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     60.35   Tc(MIN.) =   10.05
  TOTAL AREA(ACRES) =     18.40
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    341.00 =  4435.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    341.00 TO NODE    344.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   267.80  DOWNSTREAM(FEET) =   265.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.60
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     60.35
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  10.08
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    344.00 =  4475.90 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    344.00 TO NODE    345.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    265.00  DOWNSTREAM(FEET) =    264.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   115.00   CHANNEL SLOPE =  0.0087
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 CHANNEL FLOW THRU SUBAREA(CFS) =     60.35
 FLOW VELOCITY(FEET/SEC.) =   2.84   FLOW DEPTH(FEET) =   0.58
 TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =  10.75
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    345.00 =  4590.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    345.00 TO NODE    345.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1       60.35    10.75        5.628        18.40
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    345.00 =  4590.90 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1      169.97    16.90        4.205       106.80
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    345.00 =  4284.20 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1      168.50      10.75        5.628
    2      215.06      16.90        4.205

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    215.06   Tc(MIN.) =   16.90
 TOTAL AREA(ACRES) =    125.20

****************************************************************************
 FLOW PROCESS FROM NODE    345.00 TO NODE    345.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    345.00 TO NODE    345.10 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    264.00  DOWNSTREAM(FEET) =    262.10
 CHANNEL LENGTH THRU SUBAREA(FEET) =   558.00   CHANNEL SLOPE =  0.0034
 CHANNEL BASE(FEET) =  100.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.679
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    217.37
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.39
 AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   3.89
 Tc(MIN.) =  20.78
```

```
 SUBAREA AREA(ACRES) =     3.60       SUBAREA RUNOFF(CFS) =     4.64
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.379
 TOTAL AREA(ACRES) =    128.80         PEAK FLOW RATE(CFS) =     215.06

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =   2.39
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    345.10 =  5148.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    345.10 TO NODE    349.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   262.10  DOWNSTREAM(FEET) =   262.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  66.0 INCH PIPE IS  51.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
 ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    215.06
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  20.82
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    349.10 =  5168.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    349.10 TO NODE    349.10 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    346.00 TO NODE    347.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    278.50
 DOWNSTREAM ELEVATION(FEET) =    277.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.363
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    347.00 TO NODE    348.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  277.00  DOWNSTREAM ELEVATION(FEET) =  269.30
 STREET LENGTH(FEET) =   412.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       2.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   2.52   Tc(MIN.) =   4.89
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     2.41
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       3.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.70
  FLOW VELOCITY(FEET/SEC.) =  3.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE    346.00 TO NODE    348.00 =   472.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    348.00 TO NODE    349.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   269.30  DOWNSTREAM(FEET) =   263.40
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.21
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   4.94
  LONGEST FLOWPATH FROM NODE    346.00 TO NODE    349.00 =   512.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    349.00 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.) =   4.94
  RAINFALL INTENSITY(INCH/HR) =   9.22
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.21

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    351.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    278.50
  DOWNSTREAM ELEVATION(FEET) =    277.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.363
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    351.00 TO NODE    349.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  277.00  DOWNSTREAM ELEVATION(FEET) =  269.30
  STREET LENGTH(FEET) =   412.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   2.52   Tc(MIN.) =   4.89
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =    2.41
  TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =       3.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.70
  FLOW VELOCITY(FEET/SEC.) =  3.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    349.00 =   472.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    349.00 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.) =   4.89
  RAINFALL INTENSITY(INCH/HR) =   9.22
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.21     4.94        9.222          0.40
      2        3.21     4.89        9.222          0.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.39     4.89        9.222
      2        6.42     4.94        9.222

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      6.42   Tc(MIN.) =    4.94
  TOTAL AREA(ACRES) =      0.80
```

```
 LONGEST FLOWPATH FROM NODE    346.00 TO NODE    349.00 =   512.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    349.00 TO NODE    349.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   263.00  DOWNSTREAM(FEET) =   262.10
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.49
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.42
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   4.97
 LONGEST FLOWPATH FROM NODE    346.00 TO NODE    349.10 =   532.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    349.10 TO NODE    349.10 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF     Tc       INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1         6.42     4.97        9.222        0.80
 LONGEST FLOWPATH FROM NODE    346.00 TO NODE    349.10 =   532.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF     Tc       INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1       215.06    20.82        3.675      128.80
 LONGEST FLOWPATH FROM NODE    302.00 TO NODE    349.10 =  5168.90 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1       57.76       4.97        9.222
    2      217.61      20.82        3.675

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    217.61   Tc(MIN.) =   20.82
 TOTAL AREA(ACRES) =    129.60

****************************************************************************
 FLOW PROCESS FROM NODE    349.10 TO NODE    349.10 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| FLOW ENTERS HORSE RANCH CREEK FLOOD PLAIN                                |
| SEE PONDPACK ANALYSIS                                                    |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    353.00 TO NODE    354.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTAIL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  89
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    279.00
```

```
 DOWNSTREAM ELEVATION(FEET) =    278.40
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.553
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.745
 SUBAREA RUNOFF(CFS) =      0.49
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
 FLOW PROCESS FROM NODE    354.00 TO NODE    355.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    278.40  DOWNSTREAM(FEET) =    270.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   840.00   CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.052
 RESIDENTAIL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  89
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     21.87
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.59
 AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   3.05
 Tc(MIN.) =   9.61
 SUBAREA AREA(ACRES) =    11.10       SUBAREA RUNOFF(CFS) =   42.32
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.630
 TOTAL AREA(ACRES) =     11.20         PEAK FLOW RATE(CFS) =      42.71

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.81   FLOW VELOCITY(FEET/SEC.) =   5.40
 LONGEST FLOWPATH FROM NODE    353.00 TO NODE    355.00 =   900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    355.00 TO NODE    355.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   264.00  DOWNSTREAM(FEET) =   262.70
 FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.48
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     42.71
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   9.83
 LONGEST FLOWPATH FROM NODE    353.00 TO NODE    355.10 =  1030.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    355.10 TO NODE    355.10 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    356.10 TO NODE    357.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    289.00
 DOWNSTREAM ELEVATION(FEET) =    287.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.147
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    357.10 TO NODE    358.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  287.00  DOWNSTREAM ELEVATION(FEET) =  267.00
  STREET LENGTH(FEET) =   854.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       5.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   3.87   Tc(MIN.) =   6.01
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.188
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    8.55
  TOTAL AREA(ACRES) =      1.30        PEAK FLOW RATE(CFS) =       9.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.37
  FLOW VELOCITY(FEET/SEC.) =  4.24   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    356.10 TO NODE    358.00 =   914.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    358.00 TO NODE    355.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   263.45  DOWNSTREAM(FEET) =   262.70
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.26
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   6.21
  LONGEST FLOWPATH FROM NODE    356.10 TO NODE    355.10 =   989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    355.10 TO NODE    355.10 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF     Tc       INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)    (INCH/HOUR)   (ACRE)
      1        9.26     6.21        8.021        1.30
```

```
 LONGEST FLOWPATH FROM NODE    356.10 TO NODE    355.10 =   989.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1       42.71     9.83       5.961       11.20
 LONGEST FLOWPATH FROM NODE    353.00 TO NODE    355.10 =  1030.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      36.22       6.21       8.021
    2      49.59       9.83       5.961

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     49.59   Tc(MIN.) =    9.83
 TOTAL AREA(ACRES) =     12.50

****************************************************************************
 FLOW PROCESS FROM NODE    355.10 TO NODE    355.10 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    355.10 TO NODE    355.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   262.70  DOWNSTREAM(FEET) =   262.10
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.63
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     49.59
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   9.94
 LONGEST FLOWPATH FROM NODE    353.00 TO NODE    355.20 =  1090.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    355.20 TO NODE    355.20 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.) =   9.94
 RAINFALL INTENSITY(INCH/HR) =   5.92
 TOTAL STREAM AREA(ACRES) =    12.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     49.59

****************************************************************************
 FLOW PROCESS FROM NODE    355.30 TO NODE    355.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    289.00
 DOWNSTREAM ELEVATION(FEET) =    287.80
 ELEVATION DIFFERENCE(FEET) =      1.20
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.545
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    355.40 TO NODE    355.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  287.80  DOWNSTREAM ELEVATION(FEET) =  266.30
 STREET LENGTH(FEET) =   953.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       4.04
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =   10.31
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.14
 STREET FLOW TRAVEL TIME(MIN.) =   4.64   Tc(MIN.) =   7.19
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.296
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    1.00     SUBAREA RUNOFF(CFS) =    6.35
 TOTAL AREA(ACRES) =      1.10       PEAK FLOW RATE(CFS) =       6.98

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.95
 FLOW VELOCITY(FEET/SEC.) =  3.89   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
 LONGEST FLOWPATH FROM NODE    355.30 TO NODE    355.20 =  1013.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    355.20 TO NODE    355.20 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.) =   7.19
 RAINFALL INTENSITY(INCH/HR) =   7.30
 TOTAL STREAM AREA(ACRES) =     1.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.98

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       49.59     9.94        5.921         12.50
    2        6.98     7.19        7.296          1.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       42.85     7.19        7.296
    2       55.25     9.94        5.921
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     55.25   Tc(MIN.) =    9.94
 TOTAL AREA(ACRES) =     13.60
 LONGEST FLOWPATH FROM NODE    353.00 TO NODE    355.20 =  1090.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    355.20 TO NODE    355.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   266.30  DOWNSTREAM(FEET) =   266.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.91
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     55.25
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =  10.13
 LONGEST FLOWPATH FROM NODE    353.00 TO NODE    355.50 =  1170.00 FEET.

+--------------------------------------------------------------------------+
| FLOW ENTERS HORSE RANCH CREEK                                            |
| SEE PONDPACK ANALYSIS IN THIS REPORT                                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    356.00 TO NODE    357.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    318.00
 DOWNSTREAM ELEVATION(FEET) =    317.40
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.207
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    357.00 TO NODE    357.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  317.40  DOWNSTREAM ELEVATION(FEET) =  314.80
 STREET LENGTH(FEET) =   391.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       1.79
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.44
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.77
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   3.67   Tc(MIN.) =   6.88
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.506
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     1.96
  TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =       2.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.07
  FLOW VELOCITY(FEET/SEC.) =  1.94   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE    356.00 TO NODE    357.20 =   451.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    357.20 TO NODE    357.20 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.) =   6.88
  RAINFALL INTENSITY(INCH/HR) =   7.51
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.61

****************************************************************************
  FLOW PROCESS FROM NODE    357.30 TO NODE    357.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    318.00
  DOWNSTREAM ELEVATION(FEET) =    317.40
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.207
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    357.40 TO NODE    357.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  317.40  DOWNSTREAM ELEVATION(FEET) =  314.80
  STREET LENGTH(FEET) =   391.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.44
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   3.67   Tc(MIN.) =   6.88
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.506
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.96
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       2.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.07
  FLOW VELOCITY(FEET/SEC.) =  1.94   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE    357.30 TO NODE    357.50 =   451.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    357.50 TO NODE    357.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   308.80  DOWNSTREAM(FEET) =   308.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.61
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   6.99
  LONGEST FLOWPATH FROM NODE    357.30 TO NODE    357.20 =   491.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    357.20 TO NODE    357.20 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.) =   6.99
  RAINFALL INTENSITY(INCH/HR) =   7.43
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.61

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.61     6.88        7.506          0.40
      2        2.61     6.99        7.430          0.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.18     6.88       7.506
      2        5.20     6.99       7.430

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      5.20   Tc(MIN.) =    6.99
  TOTAL AREA(ACRES) =      0.80
  LONGEST FLOWPATH FROM NODE    357.30 TO NODE    357.20 =   491.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    357.20 TO NODE    336.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   308.80  DOWNSTREAM(FEET) =   275.00
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.20
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   7.08
  LONGEST FLOWPATH FROM NODE    357.30 TO NODE    336.00 =   595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 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.) =   7.08
  RAINFALL INTENSITY(INCH/HR) =   7.37
  TOTAL STREAM AREA(ACRES) =     0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.20

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    334.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    319.00
  DOWNSTREAM ELEVATION(FEET) =    316.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.361
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.154
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    335.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    316.00  DOWNSTREAM(FEET) =    292.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   240.00   CHANNEL SLOPE =  0.1000
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.424
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.98
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   2.02
  Tc(MIN.) =  11.38
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    3.42
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      1.90         PEAK FLOW RATE(CFS) =       3.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.71
  LONGEST FLOWPATH FROM NODE    333.00 TO NODE    335.00 =   340.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    335.00 TO NODE    336.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   292.00  DOWNSTREAM(FEET) =   274.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.61
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =  11.68
  LONGEST FLOWPATH FROM NODE    333.00 TO NODE    336.00 =   540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 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.) =  11.68
  RAINFALL INTENSITY(INCH/HR) =   5.34
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.61

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.20     7.08        7.371          0.80
      2        3.61    11.68        5.336          1.90

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.38     7.08        7.371
      2        7.37    11.68        5.336

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      7.38   Tc(MIN.) =    7.08
  TOTAL AREA(ACRES) =      2.70
  LONGEST FLOWPATH FROM NODE    357.30 TO NODE    336.00 =   595.00 FEET.

+--------------------------------------------------------------------------+
| FLOW ENTERS HORSE RANCH CREEK FLOOD PLAIN                                |
| SEE PONDPACK ANALYSIS                                                    |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    357.60 TO NODE    357.70 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    314.80
  DOWNSTREAM ELEVATION(FEET) =    314.00
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.914
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    357.70 TO NODE    357.80 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  314.00  DOWNSTREAM ELEVATION(FEET) =  289.00
 STREET LENGTH(FEET) =  1304.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.18
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.65
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.04
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
 STREET FLOW TRAVEL TIME(MIN.) =   7.16   Tc(MIN.) =  10.07
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.870
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    4.60
 TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       5.11

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.78
 FLOW VELOCITY(FEET/SEC.) =  3.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
 LONGEST FLOWPATH FROM NODE    357.60 TO NODE    357.80 =  1364.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    357.80 TO NODE    357.80 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.) =  10.07
 RAINFALL INTENSITY(INCH/HR) =   5.87
 TOTAL STREAM AREA(ACRES) =     1.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.11

****************************************************************************
 FLOW PROCESS FROM NODE    358.40 TO NODE    358.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    314.80
 DOWNSTREAM ELEVATION(FEET) =    314.00
 ELEVATION DIFFERENCE(FEET) =      0.80
```

```
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.914
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    358.50 TO NODE    358.60 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  314.00  DOWNSTREAM ELEVATION(FEET) =  289.00
 STREET LENGTH(FEET) =  1304.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.18
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.65
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.04
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
 STREET FLOW TRAVEL TIME(MIN.) =   7.16   Tc(MIN.) =  10.07
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.870
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    4.60
 TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       5.11

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.78
 FLOW VELOCITY(FEET/SEC.) =  3.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
 LONGEST FLOWPATH FROM NODE    358.40 TO NODE    358.60 =  1364.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    358.60 TO NODE    357.80 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   283.00  DOWNSTREAM(FEET) =   282.40
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.60
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.11
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  10.17
 LONGEST FLOWPATH FROM NODE    358.40 TO NODE    357.80 =  1404.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    357.80 TO NODE    357.80 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.) =  10.17
 RAINFALL INTENSITY(INCH/HR) =   5.83
 TOTAL STREAM AREA(ACRES) =     1.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.11

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         5.11    10.07        5.870         1.00
    2         5.11    10.17        5.832         1.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        10.16    10.07       5.870
    2        10.18    10.17       5.832

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     10.18   Tc(MIN.) =   10.17
 TOTAL AREA(ACRES) =      2.00
 LONGEST FLOWPATH FROM NODE    358.40 TO NODE    357.80 =  1404.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    357.80 TO NODE    357.90 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   282.40  DOWNSTREAM(FEET) =   264.00
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.58
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.18
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =  10.21
 LONGEST FLOWPATH FROM NODE    358.40 TO NODE    357.90 =  1459.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    357.90 TO NODE    357.90 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.) =  10.21
 RAINFALL INTENSITY(INCH/HR) =   5.82
 TOTAL STREAM AREA(ACRES) =     2.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.18

****************************************************************************
 FLOW PROCESS FROM NODE    359.10 TO NODE    359.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    304.10
 DOWNSTREAM ELEVATION(FEET) =    304.00
 ELEVATION DIFFERENCE(FEET) =      0.10
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   12.027
 WARNING: THE MINIMUM OVERLAND FLOW SLOPE, 0.5%, IS USED IN Tc CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.235
SUBAREA RUNOFF(CFS) =      0.18
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
FLOW PROCESS FROM NODE    359.20 TO NODE    359.30 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    304.00  DOWNSTREAM(FEET) =    266.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   571.00   CHANNEL SLOPE =  0.0665
CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   6.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.227
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  78
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.55
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.01
AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   4.73
Tc(MIN.) =  16.76
SUBAREA AREA(ACRES) =     4.50       SUBAREA RUNOFF(CFS) =    6.66
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =      4.60         PEAK FLOW RATE(CFS) =       6.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.51
LONGEST FLOWPATH FROM NODE    359.10 TO NODE    359.30 =   621.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    359.30 TO NODE    357.90 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   266.00  DOWNSTREAM(FEET) =   264.00
FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.79
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      6.81
PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =  17.13
LONGEST FLOWPATH FROM NODE    359.10 TO NODE    357.90 =   771.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    357.90 TO NODE    357.90 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.) =  17.13
RAINFALL INTENSITY(INCH/HR) =   4.17
TOTAL STREAM AREA(ACRES) =     4.60
PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.81

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
   1       10.18    10.21        5.819          2.00
   2        6.81    17.13        4.168          4.60

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        14.24    10.21       5.819
    2        14.10    17.13       4.168

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     14.24   Tc(MIN.) =   10.21
 TOTAL AREA(ACRES) =      6.60
 LONGEST FLOWPATH FROM NODE    358.40 TO NODE    357.90 =  1459.00 FEET.

+----------------------------------------------------------------------+
| FLOW ENTERS HORSE RANCH CREEK FLOOD PLAIN                            |
| SEE PONDPACK ANALYSIS                                                |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
 FLOW PROCESS FROM NODE    366.00 TO NODE    367.00 IS CODE =  21
----------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    319.00
 DOWNSTREAM ELEVATION(FEET) =    318.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.029
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.886
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

**********************************************************************
 FLOW PROCESS FROM NODE    367.00 TO NODE    368.00 IS CODE =  51
----------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    318.00  DOWNSTREAM(FEET) =    268.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1192.00   CHANNEL SLOPE =  0.0419
 CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.080
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.24
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.59
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   7.67
 Tc(MIN.) =  17.70
 SUBAREA AREA(ACRES) =    16.20       SUBAREA RUNOFF(CFS) =   23.13
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     16.30         PEAK FLOW RATE(CFS) =      23.28

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   3.34
 LONGEST FLOWPATH FROM NODE    366.00 TO NODE    368.00 =  1262.00 FEET.

+----------------------------------------------------------------------+
| FLOW ENTERS HORSE RANCH CREEK FLOOD PLAIN                            |
| SEE PONDPACK ANALYSIS IN THIS REPORT                                 |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
 FLOW PROCESS FROM NODE    370.00 TO NODE    371.00 IS CODE =  21
```

```
****************************************************************************
  FLOW PROCESS FROM NODE  14003.00 TO NODE  14003.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  13.43   RAIN INTENSITY(INCH/HOUR) =  4.88
  TOTAL AREA(ACRES) =    18.20   TOTAL RUNOFF(CFS) =     31.05

+--------------------------------------------------------------------------+
| FLOW DATA PER UPSTREAM HYDROLOGY IN SECTION 4                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE  14003.00 TO NODE    326.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    287.00  DOWNSTREAM(FEET) =    286.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    99.00   CHANNEL SLOPE =  0.0101
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.749
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     33.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
  AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =   0.56
  Tc(MIN.) =  13.99
  SUBAREA AREA(ACRES) =     3.00       SUBAREA RUNOFF(CFS) =    4.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =     21.20         PEAK FLOW RATE(CFS) =      35.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   2.99
  LONGEST FLOWPATH FROM NODE    370.00 TO NODE    326.00 =   301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    327.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   287.00  DOWNSTREAM(FEET) =   285.10
  FLOW LENGTH(FEET) =   186.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     35.23
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =  14.34
  LONGEST FLOWPATH FROM NODE    370.00 TO NODE    327.00 =   487.70 FEET.

+--------------------------------------------------------------------------+
| FLOW DISCHARGES ONTO HORSE RANCH CREEK FLOOD PLAIN                       |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  96
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    274.50
  DOWNSTREAM ELEVATION(FEET) =    274.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.182
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    372.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    274.00  DOWNSTREAM(FEET) =    272.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   120.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.75
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  96
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.75
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   0.53
  Tc(MIN.) =   3.72
  SUBAREA AREA(ACRES) =     0.60       SUBAREA RUNOFF(CFS) =    4.70
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  TOTAL AREA(ACRES) =      0.70         PEAK FLOW RATE(CFS) =       5.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   4.30
  LONGEST FLOWPATH FROM NODE    370.00 TO NODE    372.00 =   170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    373.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   266.00  DOWNSTREAM(FEET) =   263.50
  FLOW LENGTH(FEET) =    32.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.49
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   3.76
  LONGEST FLOWPATH FROM NODE    370.00 TO NODE    373.00 =   202.00 FEET.

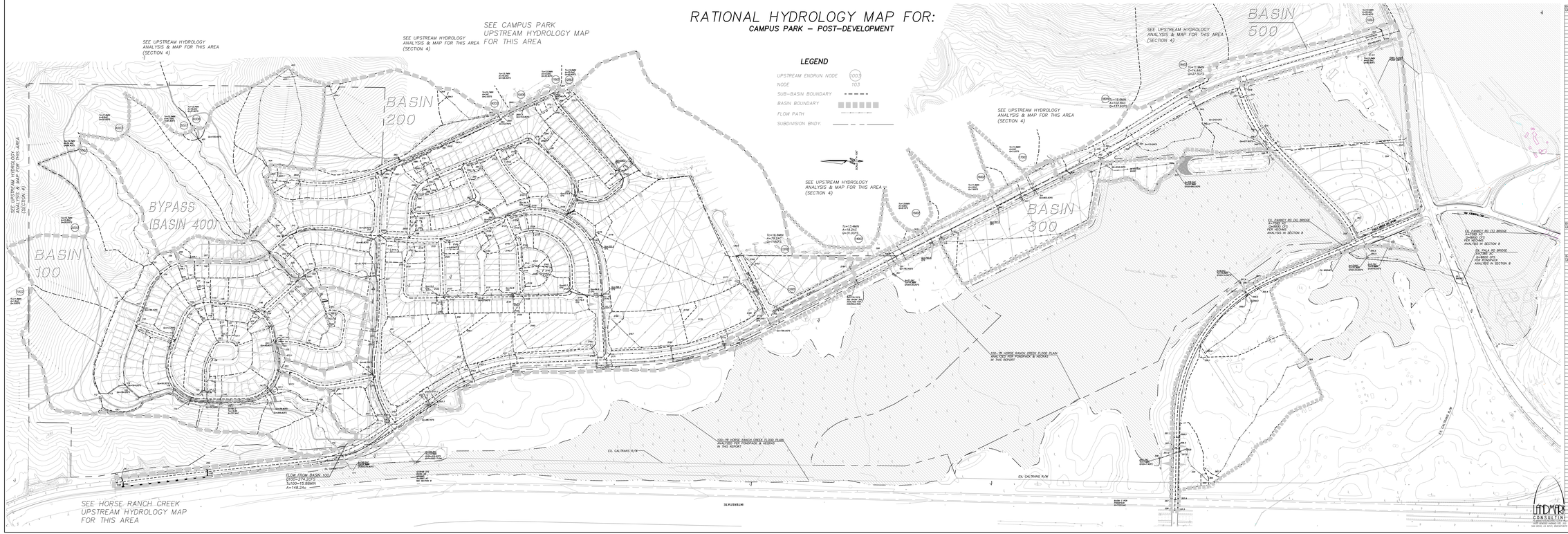
+--------------------------------------------------------------------------+
| FLOW DISCHARGES INTO EX. HORSE RANCH CREEK                               |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
```

```
 TOTAL AREA(ACRES)      =     21.20  TC(MIN.) =     14.34
 PEAK FLOW RATE(CFS)    =     35.23
================================================================================
================================================================================
 END OF RATIONAL METHOD ANALYSIS
```

SECTION 6F:
POST-DEVELOPMENT CONDITIONS - HYDROLOGY MAP (ON-SITE)

RATIONAL HYDROLOGY MAP FOR:

CAMPUS PARK – POST-DEVELOPMENT



SUB-BASIN AREA TABLE

BASIN 100		
UPSTREAM NODE	DOWNSTREAM NODE	AREA (AC)
1007	101	7.8
1008	102	10.3
1009	103	10.1
104	101	5.2
105	102	5.0
106	103	5.0
107	104	5.0
108	105	5.0
109	106	5.0
110	107	5.0
111	108	5.0
112	109	5.0
113	110	5.0
114	111	5.0
115	112	5.0
116	113	5.0
117	114	5.0
118	115	5.0
119	116	5.0
120	117	5.0
121	118	5.0
122	119	5.0
123	120	5.0
124	121	5.0
125	122	5.0
126	123	5.0
127	124	5.0
128	125	5.0
129	126	5.0
130	127	5.0
131	128	5.0
132	129	5.0
133	130	5.0
134	131	5.0
135	132	5.0
136	133	5.0
137	134	5.0
138	135	5.0
139	136	5.0
140	137	5.0
141	138	5.0
142	139	5.0
143	140	5.0
144	141	5.0
145	142	5.0
146	143	5.0
147	144	5.0
148	145	5.0
149	146	5.0
150	147	5.0
151	148	5.0
152	149	5.0
153	150	5.0
154	151	5.0
155	152	5.0
156	153	5.0
157	154	5.0
158	155	5.0
159	156	5.0
160	157	5.0
161	158	5.0
162	159	5.0
163	160	5.0
164	161	5.0
165	162	5.0
166	163	5.0
167	164	5.0
168	165	5.0
169	166	5.0
170	167	5.0
171	168	5.0
172	169	5.0
173	170	5.0
174	171	5.0
175	172	5.0
176	173	5.0
177	174	5.0
178	175	5.0
179	176	5.0
180	177	5.0
181	178	5.0
182	179	5.0
183	180	5.0
184	181	5.0
185	182	5.0
186	183	5.0
187	184	5.0
188	185	5.0
189	186	5.0
190	187	5.0
191	188	5.0
192	189	5.0
193	190	5.0
194	191	5.0
195	192	5.0
196	193	5.0
197	194	5.0
198	195	5.0
199	196	5.0
200	197	5.0
201	198	5.0
202	199	5.0
203	200	5.0
204	201	5.0
205	202	5.0
206	203	5.0
207	204	5.0
208	205	5.0
209	206	5.0
210	207	5.0
211	208	5.0
212	209	5.0
213	210	5.0
214	211	5.0
215	212	5.0
216	213	5.0
217	214	5.0
218	215	5.0
219	216	5.0
220	217	5.0
221	218	5.0
222	219	5.0
223	220	5.0
224	221	5.0
225	222	5.0
226	223	5.0
227	224	5.0
228	225	5.0
229	226	5.0
230	227	5.0
231	228	5.0
232	229	5.0
233	230	5.0
234	231	5.0
235	232	5.0
236	233	5.0
237	234	5.0
238	235	5.0
239	236	5.0
240	237	5.0
241	238	5.0
242	239	5.0
243	240	5.0
244	241	5.0
245	242	5.0
246	243	5.0
247	244	5.0
248	245	5.0
249	246	5.0
250	247	5.0
251	248	5.0
252	249	5.0
253	250	5.0
254	251	5.0
255	252	5.0
256	253	5.0
257	254	5.0
258	255	5.0
259	256	5.0
260	257	5.0
261	258	5.0
262	259	5.0
263	260	5.0
264	261	5.0
265	262	5.0
266	263	5.0
267	264	5.0
268	265	5.0
269	266	5.0
270	267	5.0
271	268	5.0
272	269	5.0
273	270	5.0
274	271	5.0
275	272	5.0
276	273	5.0
277	274	5.0
278	275	5.0
279	276	4.0

280	277	5.0
281	278	5.0
282	279	5.0
283	280	5.0
284	281	5.0
285	282	5.0
286	283	5.0
287	284	5.0
288	285	5.0
289	286	5.0
290	287	5.0
291	288	5.0
292	289	5.0
293	290	5.0
294	291	5.0
295	292	5.0
296	293	5.0
297	294	5.0
298	295	5.0
299	296	5.0
300	297	5.0
301	298	5.0
302	299	5.0
303	300	5.0
304	301	5.0
305	302	5.0
306	303	5.0
307	304	5.0
308	305	5.0
309	306	5.0
310	307	5.0
311	308	5.0
312	309	5.0
313	310	5.0
314	311	5.0
315	312	5.0
316	313	5.0
317	314	5.0
318	315	5.0
319	316	5.0
320	317	5.0
321	318	5.0
322	319	5.0
323	320	5.0
324	321	5.0
325	322	5.0
326	323	5.0
327	324	5.0
328	325	5.0
329	326	5.0
330	327	5.0
331	328	5.0
332	329	5.0
333	330	5.0
334	331	5.0
335	332	5.0
336	333	5.0
337	334	5.0
338	335	5.0
339	336	5.0
340	337	5.0
341	338	5.0
342	339	5.0
343	340	5.0
344	341	5.0
345	342	5.0
346	343	5.0
347	344	5.0
348	345	5.0
349	346	5.0
350	347	5.0
351	348	5.0
352	349	5.0
353	350	5.0
354	351	5.0
355	352	5.0
356	353	5.0
357	354	5.0
358	355	5.0
359	356	5.0
360	357	5.0
361	358	5.0
362	359	5.0
363	360	5.0
364	361	5.0
365	362	5.0
366	363	5.0
367	364	5.0
368	365	5.0
369	366	5.0
370	367	5.0
371	368	5.0
372	369	5.0
373	370	5.0
374	371	5.0
375	372	5.0
376	373	5.0
377	374	5.0
378	375	5.0
379	376	5.0
380	377	5.0
381	378	5.0
382	379	5.0
383	380	5.0
384	381	5.0
385	382	5.0
386	383	5.0
387	384	5.0
388	385	5.0
389	386	5.0
390	387	5.0
391	388	5.0
392	389	5.0
393	390	5.0
394	391	5.0
395	392	5.0
396	393	5.0
397	394	5.0
398	395	5.0
399	396	5.0
400	397	5.0
401	398	5.0
402	399	5.0
403	400	5.0
404	401	5.0
405	402	5.0
406	403	5.0
407	404	5.0
408	405	5.0
409	406	5.0
410	407	5.0
411	408	5.0
412	409	5.0
413	410	5.0
414	411	5.0
415	412	5.0
416	413	5.0
417	414	5.0
418	415	5.0
419	416	5.0
420	417	5.0
421	418	5.0
422	419	5.0
423	420	5.0
424	421	5.0
425	422	5.0
426	423	5.0
427	424	5.0
428	425	5.0
429	426	5.0
430	427	5.0
431	428	5.0
432	429	5.0
433	430	5.0
434	431	5.0
435	432	5.0
436	433	5.0
437	434	5.0
438	435	5.0
439	436	5.0
440	437	5.0
441	438	5.0
442	439	5.0
443	440	5.0
444	441	5.0
445	442	5.0
446	443	5.0
447	444	5.0
448	445	5.0
449	446	5.0
450	447	5.0
451	448	5.0
452	449	5.0
453	450	5.0
454	451	5.0
455	452	5.0
456	453	5.0
457	454	5.0
458	455	5.0
459	456	5.0
460	457	5.0
461	458	5.0
462	459	5.0
463	460	5.0
464	461	5.0
465	462	5.0
466	463	5.0
467	464	5.0
468	465	5.0
469	466	5.0
470	467	5.0
471	468	5.0
472	469	5.0
473	470	5.0
474	471	5.0
475	472	5.0
476	473	5.0
477	474	5.0
478	475	5.0
479	476	5.0
480	477	5.0
481	478	5.0
482	479	5.0
483	480	5.0
484	481	5.0
485	482	5.0
486	483	5.0
487	484	5.0
488	485	5.0
489	486	5.0
490	487	5.0
491	488	5.0
492	489	5.0
493	490	5.0
494	491	5.0
495	492	5.0
496	493	5.0
497	494	5.0
498	495	5.0
499	496	5.0
500	497	5.0
501	498	5.0
502	499	5.0
503	500	5.0
504	501	5.0
505	502	5.0
506	503	5.0
507	504	5.0
508	505	5.0
509	506	5.0
510	507	5.0
511	508	5.0
512	509	5.0
513	510	5.0
514	511	5.0
515	512	5.0
516	513	5.0
517	514	5.0
518	515	5.0
519	516	5.0
520	517	5.0
521	518	5.0
522	519	5.0
523	520	5.0
524	521	5.0
525	522	5.0
526	523	5.0
527	524	5.0
528	525	5.0
529	526	5.0
530	527	5.0
531	528	5.0
532	529	5.0
533	530	5.0
534	531	5.0
535	532	5.0
536	533	5.0
537	534	5.0
538	535	5.0
539	536	5.0
540	537	5.0
541	538	5.0
542	539	5.0
543	540	5.0
544	541	5.0
545	542	5.0
546	543	5.0
547	544	5.0
548	545	5.0
549	546	5.0
550	547	5.0
551	548	5.0
552	549	5.0
553	550	5.0
554	551	5.0
555	552	5.0
556	553	5.0
557	554	5.0
558	555	5.0
559	556	5.0
560	557	5.0
561	558	5.0
562	559	5.0
563	560	5.0
564	561	5.0
565	562	5.0
566	563	5.0
567	564	5.0
568	565	5.0
569	566	5.0
570	567	5.0
571	568	5.0
572	569	5.0
573	570	5.0
574	571	5.0
575	572	5.0
576	573	5.0
577	574	5.0
578	575	5.0
579	576	5.0
580	577	5.0
581	578	5.0
582	579	5.0
583	580	5.0
584	581	5.0
585	582	5.0
586	583	5.0
587	584	5.0
588	585	5.0
589	586	5.0
590	587	5.0
591	588	5.0
592	589	5.0
593	590	5.0
594	591	5.0
595	592	5.0
596	593	5.0
597	594	5.0
598	595	5.0
599	596	5.0
600	597	5.0
601	598	5.0
602	599	5.0
603	600	5.0
604	601	5.0
605	602	5.0
606	603	5.0
607	604	5.0
608	605	5.0
609	606	5.0
610	607	5.0
611	608	5.0
612	609	5.0
613	610	5.0
614	611	5.0
615	612	5.0
616	613	5.0
617	614	5.0
618	615	5.0
619	616	5.0
620	617	5.0
621	618	5.0
622	619	5.0
623	620	5.0
624	621	5.0
625	622	5.0
626	623	5.0
627	624	5.0
628	625	5.0
629	626	5.0
630	627	5.0
631	628	5.0
632	629	5.0
633	630	5.0
634	631	5.0
635	632	5.0
636	633	5.0
637	634	5.0
638	635	5.0
639	636	5.0
640	637	5.0
641	638	5.0
642	639	5.0
643	640	5.0
644	641	5.0
645	642	5.0
646	643	5.0
647	644	5.0
648	645	5.0
649	646	5.0
650	647	5.0
651	648	5.0
652	649	5.0
653	650	5.0
654	651	5.0
655	652	5.0
656	653	5.0
657	654	5.0
658	655	5.0
659	656	5.0
660	657	5.0
661	658	5.0
662	659	5.0
663	660	5.0
664	661	5.0
665	662	5.0
666	663	5.0
667	664	5.0
668	665	5.0
669	666	5.0
670	667	5.0
671	668	5.0
672	669	5.0
673	670	5.0
674	671	5.0
675	672	5.0
676	673	5.0
677	674	5.0
678	675	5.0
679	676	5.0
680	677	5.0
681	678	5.0
682	679	5.0
683	680	5.0
684	681	5.0
685	682	5.0
686	683	5.0
687	684	5.0
688	685	5.0
689	686	5.0
690	687	5.0
691	688	5.0
692	689	5.0
693	690	5.0
694	691	5.0
695	692	5.0
696	693	5.0
697	694	5.0
698	695	5.0
699	696	5.0
700	697	5.0
701	698	5.0
702	699	5.0
703	700	5.0
704	701	5.0
705	702	5.0
706	703	5.0
707	704	5.0
708	705	5.0
709	706	5.0
710	707	5.0
711	708	5.0
712	709	5.0
713	710	5.0
714	711	5.0
715	712	5.0
716	713	5.0
717	714	5.0
718	715	5.0
719	716	5.0
720	717	5.0
721	718	5.0
722	719	5.0
723	720	5.0
724	721	5.0
725	722	5.0
726	723	5.0
727	724	5.0
728	725	5.0
729	726	5.0
730	727	5.0
731	728	5.0
732	729	5.0
733	730	5.0
734	731	5.0
735	732	5.0
736	733	5.0
737	734	5.0
738	735	5.0
739	736	5.0
740	737	5.0
741	738	5.0
742	739	5.0
743	740	5.0
744	741	5.0
745	742	5.0
746	743	5.0
747	744	5.0
748	745	5.0
749	746	5.0
750	747	5.0
751	748	5.0
752	749	5.0
753	750	5.0
754	751	5.0
755	752	5.0
756	753	5.0
757	754	5.0
758	755	5.0
759	756	5.0
760	757	5.0
761	758	5.0
762	759	5.0
763	760	5.0
764	761	5.0
765	762	5.0
766	763	5.0
767	764	5.0
768	765	5.0
769	766	5.0
770	767	5.0
771	768	5.0
772	769	5.0
773	770	5.0
774	771	5.0
775	772	5.0
776	773	5.0
777	774	5.0
778	775	5.0
779	776	5.0
780	777	5.0
781	778	5.0
782	779	5.0
783	780	5.0
784	781	5.0
785	782	5.0
786	783	5.0
787	784	5.0
788	785	5.0
789	786	5.0
790	787	5.0
791	788	5.0
792	789	5.0
793	790	5.0
794	791	5.0
795	792	5.0
796	793	5.0
797	794	5.0
798	795	5.0
799	796	5.0
800	797	5.0
801	798	5.0
802	799	5.0
803	800	5.0
804	801	5.0
805	802	5.0
806	803	5.0
807	804	5.0
808	805	5.0
809	806	5.0
810	807	5.0
811	808	5.0
812	809	5.0
813	810	5.0
814	811	5.0
815	812	5.0
816	813	5.0
817	814	5.0
818	815	5.0
819	816	5.0
820	817	5.0
821	818	5.0
822	819	5.0
823	820	5.0
824	821	5.0
825	822	5.0
826	823	5.0
827	824	5.0
828	825	5.0
829	826	5.0
830	827	5.0
831	828	5.0
832	829	5.0
833	830	5.0
834	831	5.0
835	832	5.0
836	833	5.0
837	834	5.0
838	835	5.0
839	836	5.0
840	837	5.0
841	838	5.0
842	839	5.0
843	840	5.0
844	841	5.0
845	842	5.0
846	843	5.0
847	844	5.0
848	845	5.0
849	846	5.0
850	847	5.0
851	848	5.0
852	849	5.0
853	850	5.0
854	851	5.0
855	852	5.0
856	853	5.0
857	854	5.0
858	855	5.0
859	856	5.0
860	857	5.0
861	858	5.0
862	859	5.0
863	860	5.0
864	861	5.0
865	862	5.0
866	863	5.0
867	864	5.0
868	865	5.0
869	866	5.0
870	867	5.0
871	868	5.0
872	869	5.0
873	870	5.0
874	871	5.0
875	872	5.0
876	873	5.0
877	874	5.0
878	875	5.0
879	876	5.0
880	877	5.0
881	878	5.0
882	879	5.0
883	880	5.0
884	881	5.0
885	882	5.0
886	883	5.0
887	884	5.0
888	885	5.0
889	886	5.0
890	887	5.0
891	888	5.0
892	889	5.0
893	890	5.0
894	891	5.0
895	892	5.0
896	893	5.0
897	894	5.0
898	895	5.0
899	896	5.0
900	897	5.0
901	898	5.0
902	899	5.0
903	900	5.0
904	901	5.0
905	902	5.0
906	903	5.0
907	904	5.0
908	905	5.0
909	906	5.0
910	907	5.0
911	908	5.0
912	909	5.0
913	910	5.0
914	911	5.0
915	912	5.0
916	913	5.0
917	914	5.0
918	915	5.0
919	916	5.0
920	917	5.0
921	918	5.0
922	919	5.0
923	920	5.0
924	921	5.0
925	922	5.0
926	923	5.0
927	924	5.0
928	925	5.0
929	926	5.0
930	927	5.0
931	928	5.0
932	929	5.0
933	930	5.0
934	931	5.0
935	932	5.0
936	933	5.0
937	934	5.0
938	935	5.0
939	936	5.0
940	937	5.0
941	938	5.0
942	939	5.0
943	940	5.0
944	941	5.0
945	942	5.0
946	943	5.0
947	944	5.0
948	945	5.0
949	946	5.0
950	947	5.0
951	948	5.0
952	949	5.0
953	950	5.0
954	951	5.0
955	952	5.0
956	953	5.0
957	954	5.0
958	955	5.0
959	956	5.0
960	957	5.0
961	958	5.0
962	959	5.0
963	960	5.0
964	961	5.0
965	962	5.0
966	963	5.0
967	964	5.0
968	965	5.0
969	966	5.0
970	967	5.0
971	968	5.0
972	969	5.0
973	970	5.0
974	971	5.0
975	972	5.0
976	973	5.0
977	974	5.0
978	975	5.0
979	976	5.0
980	977	5.0
981	978	5.0
982	979	5.0
983	980	5.0
984	981	5.0
985	982	5.0
986	983	5.0
987	984	5.0
988	985	5.0
989	986	5.0
990	987	5.0
991	988	5.0
992	989	5.0
993	990	5.0
994	991	5.0
995	992	5.0
996	993	5.0
997	994	5.0
998	995	5.0
999	996	5.0
1000	997	5.0
1001	998	5.0
1002	999	5.0
1003	1000	5.0
1004	1001	5.0
1005	1002	5.0
1006	1003	5.0
1007	1004	5.0
1008	1005	5.0
1009	1006	5.0
1010	1007	5.0
1011	1008	5.0
1012	1009	5.0
1013	1010	5.0
1014	1011	5.0
1015	1012	5.0
1016	1013	5.0
1017	1014	5.0
1018	1015	5.0
1019	1016	5.0
1020	1017	5.0
1021	1018	5.0
1022	1019	5.0
1023	1020	5.0
1024	1021	5.0
1025	1022	5.0
1026	1023	5.0
1027	1024	5.0
1028	1025	5.0
1029	1026	5.0
1030	1027	5.0
1031	1028	5.0
1032	1029	5.0
1033	1030	5.0
1034	1031	5.0
1035	1032	5.0
1036	1033	5.0
1037	1034	5.0
1038	1035	5.0
1039	1036	5.0
1040	1037	5.0
1041	1038	5.0
1042	1039	5.0
1043	1040	5.0
1044	1041	5.0
1045	1042	5.0
1046	1043	5.0
1047	1044	5.0
1048	1045	5.0
1049	1046	5.0
1050	1047	5.0
1051	1048	5.0
1052	1049	5.0
1053	1050	5.0
1054	1051	5.0
1055	1052	5.0
1056	1053

SECTION 7:
OFF-SITE INTERSECTIONS ANALYSIS

SECTION 7A:
OFF-SITE INTERSECTIONS
RATIONAL HYDROLOGY AND HYDRAULICS CALCULATIONS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2004 Advanced Engineering Software (aes)
              Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                              Analysis prepared by:

                                LANDMARK CONSULTING
                           9555 GENESEE AVENUE, SUITE 200
                                SAN DEIGO, CA 92121
                                 TEL:  858-587-8070

 ************************** DESCRIPTION OF STUDY **************************
* CAMPUS PARK                                                             *
* OFFSITE INTERSECTIONS                                                   *
* 100-YEAR STORM                                                          *
 *************************************************************************

  FILE NAME: 614OSI.DAT
  TIME/DATE OF STUDY: 16:17 05/06/2009
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ======= ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+------------------------------------------------------------------------+
| PALA ROAD AT I-15                                                      |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    300.60
  DOWNSTREAM ELEVATION(FEET) =    300.00
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.983
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.319
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    300.00  DOWNSTREAM(FEET) =    287.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   248.00   CHANNEL SLOPE =  0.0496
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.925
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.37
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.95
  Tc(MIN.) =   9.93
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    7.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.692
  TOTAL AREA(ACRES) =      2.00         PEAK FLOW RATE(CFS) =       8.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   5.51
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =   298.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   287.70  DOWNSTREAM(FEET) =   286.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.33
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      8.20
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  10.04
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =   358.00 FEET.

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

```
 FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    286.00  DOWNSTREAM(FEET) =    276.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   357.00   CHANNEL SLOPE =  0.0280
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   6.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.050
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  94
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     16.69
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.22
 AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   2.68
 Tc(MIN.) =  12.72
 SUBAREA AREA(ACRES) =     4.70       SUBAREA RUNOFF(CFS) =   16.85
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.705
 TOTAL AREA(ACRES) =      6.70         PEAK FLOW RATE(CFS) =      23.84

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.59
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =   715.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   273.00  DOWNSTREAM(FEET) =   272.70
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.70
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     23.84
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  12.74
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =   730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 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.) =  12.74
 RAINFALL INTENSITY(INCH/HR) =   5.04
 TOTAL STREAM AREA(ACRES) =     6.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.84

+--------------------------------------------------------------------------+
| FLOW ENTERS EXISTING 24" GRATED INLET BOX                                |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    285.00
 DOWNSTREAM ELEVATION(FEET) =    284.50
 ELEVATION DIFFERENCE(FEET) =      0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.546
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.077
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    284.50  DOWNSTREAM(FEET) =    275.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1620.00   CHANNEL SLOPE =  0.0056
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.130
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  94
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.17
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.57
 AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =  17.15
 Tc(MIN.) =  26.70
 SUBAREA AREA(ACRES) =     9.00       SUBAREA RUNOFF(CFS) =   20.00
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.706
 TOTAL AREA(ACRES) =      9.10         PEAK FLOW RATE(CFS) =      20.11

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   2.02
 LONGEST FLOWPATH FROM NODE    107.00 TO NODE    109.00 =  1670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   273.00  DOWNSTREAM(FEET) =   272.70
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.11
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  26.76
```

```
 LONGEST FLOWPATH FROM NODE    107.00 TO NODE    106.00 =  1700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 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.) =  26.76
 RAINFALL INTENSITY(INCH/HR) =   3.13
 TOTAL STREAM AREA(ACRES) =     9.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.11

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       23.84    12.74        5.044          6.70
    2       20.11    26.76        3.125          9.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       33.42    12.74       5.044
    2       34.88    26.76       3.125

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     34.88   Tc(MIN.) =   26.76
 TOTAL AREA(ACRES) =     15.80
 LONGEST FLOWPATH FROM NODE    107.00 TO NODE    106.00 =  1700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    110.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   272.70  DOWNSTREAM(FEET) =   270.24
 FLOW LENGTH(FEET) =   246.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.10
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     34.88
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =  27.13
 LONGEST FLOWPATH FROM NODE    107.00 TO NODE    110.00 =  1946.00 FEET.

+--------------------------------------------------------------------------+
| FLOWS CROSS I15 VIA EXISTING PIPE                                        |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
```

```
+----------------------------------------------------------------------------+
| EASTERLY RAMP                                                              |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    306.10
  DOWNSTREAM ELEVATION(FEET) =    305.70
  ELEVATION DIFFERENCE(FEET) =      0.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.347
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.831
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    305.70  DOWNSTREAM(FEET) =    277.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   530.00   CHANNEL SLOPE =  0.0532
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.440
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.62
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   3.38
  Tc(MIN.) =   8.72
  SUBAREA AREA(ACRES) =     2.40       SUBAREA RUNOFF(CFS) =   10.97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  TOTAL AREA(ACRES) =      2.50         PEAK FLOW RATE(CFS) =      11.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   3.19
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =   580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   276.00  DOWNSTREAM(FEET) =   272.10
  FLOW LENGTH(FEET) =   431.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.60
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.43
 PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   9.81
 LONGEST FLOWPATH FROM NODE    111.00 TO NODE    114.00 =  1011.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    922.60
 DOWNSTREAM ELEVATION(FEET) =    920.00
 ELEVATION DIFFERENCE(FEET) =      2.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.510
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.661
 SUBAREA RUNOFF(CFS) =      0.30
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    920.00  DOWNSTREAM(FEET) =    415.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00   CHANNEL SLOPE =  0.5050
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.606
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.59
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.80
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   2.88
 Tc(MIN.) =   8.39
 SUBAREA AREA(ACRES) =     7.00       SUBAREA RUNOFF(CFS) =   16.19
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      7.10         PEAK FLOW RATE(CFS) =      16.42

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   7.51
 LONGEST FLOWPATH FROM NODE    115.00 TO NODE    117.00 =  1050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    415.00  DOWNSTREAM(FEET) =    309.55
```

```
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2250.00   CHANNEL SLOPE =  0.0469
 CHANNEL BASE(FEET) =    3.50   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.468
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     39.38
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.12
 AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   2.86
 Tc(MIN.) =  11.24
 SUBAREA AREA(ACRES) =    23.90       SUBAREA RUNOFF(CFS) =   45.74
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =     31.00         PEAK FLOW RATE(CFS) =      59.33

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.79   FLOW VELOCITY(FEET/SEC.) =  14.77
 LONGEST FLOWPATH FROM NODE    115.00 TO NODE    118.00 =  3300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   309.55  DOWNSTREAM(FEET) =   308.20
 FLOW LENGTH(FEET) =    27.00   MANNING'S N =  0.024
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) = 887.92
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   3.50    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     59.33
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =  11.24
 LONGEST FLOWPATH FROM NODE    115.00 TO NODE    119.00 =  3327.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4600
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  84
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    380.00
 DOWNSTREAM ELEVATION(FEET) =    378.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.132
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.068
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.42
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  378.00  DOWNSTREAM ELEVATION(FEET) =  320.00
 STREET LENGTH(FEET) =  1850.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 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) =      33.82
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.59
   HALFSTREET FLOOD WIDTH(FEET) =   24.02
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.32
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.74
 STREET FLOW TRAVEL TIME(MIN.) =   4.88   Tc(MIN.) =  10.01
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.894
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4600
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  84
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.460
 SUBAREA AREA(ACRES) =   23.90      SUBAREA RUNOFF(CFS) =   64.80
 TOTAL AREA(ACRES) =     24.00        PEAK FLOW RATE(CFS) =      65.07

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
 FLOW VELOCITY(FEET/SEC.) =  7.27   DEPTH*VELOCITY(FT*FT/SEC.) =   5.08
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
        AND L = 1850.0 FT WITH ELEVATION-DROP =  58.0 FT, IS   75.7 CFS,
        WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    122.00
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =  1900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   313.50  DOWNSTREAM(FEET) =   310.00
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.024
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.26
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     65.07
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =  10.13
```

```
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =  2000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 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.) =  10.13
 RAINFALL INTENSITY(INCH/HR) =   5.85
 TOTAL STREAM AREA(ACRES) =    24.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     65.07

****************************************************************************
 FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    322.00
 DOWNSTREAM ELEVATION(FEET) =    321.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.324
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    123.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  321.00  DOWNSTREAM ELEVATION(FEET) =  317.00
 STREET LENGTH(FEET) =   153.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 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) =       1.60
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    6.16
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.01
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =   3.17
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.60
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       2.41

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.84
 FLOW VELOCITY(FEET/SEC.) =  3.24   DEPTH*VELOCITY(FT*FT/SEC.) =   0.98
 LONGEST FLOWPATH FROM NODE    124.00 TO NODE    123.00 =   203.00 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 =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   3.17
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.41

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       65.07    10.13        5.847         24.00
    2        2.41     3.17        9.222          0.30

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       22.76     3.17       9.222
    2       66.60    10.13       5.847

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     66.60   Tc(MIN.) =   10.13
 TOTAL AREA(ACRES) =     24.30
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =  2000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    119.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   308.20
 FLOW LENGTH(FEET) =   122.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.9 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.22
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     66.60
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  10.30
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    119.00 =  2122.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1       66.60    10.30       5.786       24.30
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    119.00 =  2122.50 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
    1       59.33    11.24       5.468       31.00
 LONGEST FLOWPATH FROM NODE    115.00 TO NODE    119.00 =  3327.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1     120.95      10.30        5.786
    2     122.26      11.24        5.468

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    122.26   Tc(MIN.) =   11.24
 TOTAL AREA(ACRES) =     55.30

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 TO NODE    126.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   308.20  DOWNSTREAM(FEET) =   307.50
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.30
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    122.26
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =  11.28
 LONGEST FLOWPATH FROM NODE    115.00 TO NODE    126.00 =  3367.00 FEET.

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

```
 FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   307.50  DOWNSTREAM(FEET) =   289.50
 FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.024
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  31.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
 GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    122.26
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =  11.77
 LONGEST FLOWPATH FROM NODE    115.00 TO NODE    127.00 =  3767.00 FEET.

+--------------------------------------------------------------------------+
| FLOW CROSSES I-15 VIA EXISTING STORM DRAIN                               |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    305.60
 DOWNSTREAM ELEVATION(FEET) =    305.20
 ELEVATION DIFFERENCE(FEET) =      0.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.153
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  305.20  DOWNSTREAM ELEVATION(FEET) =  299.10
 STREET LENGTH(FEET) =   756.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 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) =       2.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   6.29   Tc(MIN.) =   9.44
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.119
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.55      SUBAREA RUNOFF(CFS) =     2.93
  TOTAL AREA(ACRES) =      0.65        PEAK FLOW RATE(CFS) =       3.46

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.46
  FLOW VELOCITY(FEET/SEC.) =  2.19   DEPTH*VELOCITY(FT*FT/SEC.) =   0.84
  LONGEST FLOWPATH FROM NODE    128.00 TO NODE    130.00 =   806.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 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.) =   9.44
  RAINFALL INTENSITY(INCH/HR) =   6.12
  TOTAL STREAM AREA(ACRES) =     0.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.46

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    30.00
  UPSTREAM ELEVATION(FEET) =    318.20
  DOWNSTREAM ELEVATION(FEET) =    315.00
  ELEVATION DIFFERENCE(FEET) =      3.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.432
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    315.00  DOWNSTREAM(FEET) =    301.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0700
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.565
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.53
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   2.17
 Tc(MIN.) =   5.61
 SUBAREA AREA(ACRES) =     0.90       SUBAREA RUNOFF(CFS) =    2.70
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      1.00         PEAK FLOW RATE(CFS) =       3.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.94
 LONGEST FLOWPATH FROM NODE    131.00 TO NODE    133.00 =   230.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    133.00 TO NODE    130.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  301.00  DOWNSTREAM ELEVATION(FEET) =  299.10
 STREET LENGTH(FEET) =   346.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 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) =       6.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.48
   HALFSTREET FLOOD WIDTH(FEET) =   17.93
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.21
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
 STREET FLOW TRAVEL TIME(MIN.) =   2.61   Tc(MIN.) =   8.22
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.694
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    7.50
 TOTAL AREA(ACRES) =      4.20        PEAK FLOW RATE(CFS) =       9.84

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.82
 FLOW VELOCITY(FEET/SEC.) =  2.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.29
```

```
 LONGEST FLOWPATH FROM NODE    131.00 TO NODE    130.00 =   576.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 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.) =   8.22
 RAINFALL INTENSITY(INCH/HR) =   6.69
 TOTAL STREAM AREA(ACRES) =     4.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.84

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         3.46     9.44        6.119          0.65
    2         9.84     8.22        6.694          4.20

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        12.85     8.22       6.694
    2        12.46     9.44       6.119

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     12.85   Tc(MIN.) =    8.22
 TOTAL AREA(ACRES) =      4.85
 LONGEST FLOWPATH FROM NODE    128.00 TO NODE    130.00 =   806.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    134.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  299.10  DOWNSTREAM ELEVATION(FEET) =  291.00
 STREET LENGTH(FEET) =   731.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 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) =      14.47
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.54
```

```
   HALFSTREET FLOOD WIDTH(FEET) =   21.05
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.48
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.88
 STREET FLOW TRAVEL TIME(MIN.) =   3.50   Tc(MIN.) =  11.71
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.326
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.476
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    3.24
 TOTAL AREA(ACRES) =      5.55        PEAK FLOW RATE(CFS) =      14.08

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  20.90
 FLOW VELOCITY(FEET/SEC.) =  3.44   DEPTH*VELOCITY(FT*FT/SEC.) =   1.84
 LONGEST FLOWPATH FROM NODE    128.00 TO NODE    134.00 =  1537.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    135.00 TO NODE    136.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    20.00
 UPSTREAM ELEVATION(FEET) =    340.00
 DOWNSTREAM ELEVATION(FEET) =    330.00
 ELEVATION DIFFERENCE(FEET) =     10.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.803
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
 FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    330.00  DOWNSTREAM(FEET) =    294.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   118.00   CHANNEL SLOPE =  0.3008
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
```

```
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.48
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.36
 AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =   0.83
 Tc(MIN.) =   3.64
 SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.32
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.65

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   2.43
 LONGEST FLOWPATH FROM NODE    135.00 TO NODE    137.00 =   138.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   291.56  DOWNSTREAM(FEET) =   288.22
 FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.024
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.25
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.65
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   4.10
 LONGEST FLOWPATH FROM NODE    135.00 TO NODE    138.00 =   229.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 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.) =   4.10
 RAINFALL INTENSITY(INCH/HR) =   9.22
 TOTAL STREAM AREA(ACRES) =     0.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.65

****************************************************************************
 FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    313.50
 DOWNSTREAM ELEVATION(FEET) =    312.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.877
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.76
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    141.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    312.00  DOWNSTREAM(FEET) =    296.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   309.00   CHANNEL SLOPE =  0.0518
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.30
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.56
  Tc(MIN.) =   4.44
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    3.02
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =      0.50         PEAK FLOW RATE(CFS) =       3.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   3.95
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    141.00 =   369.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    138.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    296.00  DOWNSTREAM(FEET) =    290.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   395.00   CHANNEL SLOPE =  0.0139
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.354
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.74
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   1.39
  Tc(MIN.) =   5.83
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =   13.02
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =      2.40         PEAK FLOW RATE(CFS) =      16.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   5.33
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    138.00 =   764.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    134.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   288.14  DOWNSTREAM(FEET) =   287.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.024
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     16.44
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   5.91
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    134.00 =   794.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================
***MEMORY FUNCTION CAN NOT BE ACCESSED - PROCESS IGNORED.***

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
================================================================================
***MEMORY FUNCTION CAN NOT BE ACCESSED - PROCESS IGNORED.***

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    142.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   287.50  DOWNSTREAM(FEET) =   286.25
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.024
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     16.44
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   6.18
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    142.00 =   879.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    142.00 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.) =   6.18
  RAINFALL INTENSITY(INCH/HR) =   8.04
  TOTAL STREAM AREA(ACRES) =     2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.44

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    144.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    298.50
  DOWNSTREAM ELEVATION(FEET) =    297.30
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.545
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    142.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  297.30  DOWNSTREAM ELEVATION(FEET) =  280.63
  STREET LENGTH(FEET) =   588.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  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) =       3.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   2.70   Tc(MIN.) =   5.25
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.937
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.74      SUBAREA RUNOFF(CFS) =    5.75
  TOTAL AREA(ACRES) =      0.84        PEAK FLOW RATE(CFS) =       6.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.46
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE    143.00 TO NODE    142.00 =   648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    142.00 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.) =   5.25
  RAINFALL INTENSITY(INCH/HR) =   8.94
  TOTAL STREAM AREA(ACRES) =     0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.53

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       16.44     6.18       8.044          2.40
      2        6.53     5.25       8.937          0.84

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       20.49     5.25       8.937
      2       22.32     6.18       8.044

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     22.32   Tc(MIN.) =    6.18
  TOTAL AREA(ACRES) =      3.24
  LONGEST FLOWPATH FROM NODE    143.00 TO NODE    142.00 =   648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    145.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   286.17  DOWNSTREAM(FEET) =   285.45
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.024
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     22.32
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   6.26
  LONGEST FLOWPATH FROM NODE    143.00 TO NODE    145.00 =   682.00 FEET.

 +--------------------------------------------------------------------------+
 | FLOW EXITS EX. 24" CMP AND DISCHARGES ONTO EXIST. TERRAIN S'LY OF PALA   |
 | ROAD                                                                     |
 |                                                                          |
 +--------------------------------------------------------------------------+
+----------------------------------------------------------------------------+
 | RECHE RD. AT OLD HWY 395                                                 |
 | CANONITA RD. AT OLD HWY 395                                              |
 |                                                                          |
 +--------------------------------------------------------------------------+

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

```
 FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    741.00
 DOWNSTREAM ELEVATION(FEET) =    740.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.577
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.053
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE    702.00 TO NODE    703.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    740.00  DOWNSTREAM(FEET) =    535.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2100.00   CHANNEL SLOPE =  0.0975
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.232
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  82
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.45
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.82
 AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   9.15
 Tc(MIN.) =  16.73
 SUBAREA AREA(ACRES) =    15.70       SUBAREA RUNOFF(CFS) =   27.24
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.410
 TOTAL AREA(ACRES) =     15.80         PEAK FLOW RATE(CFS) =      27.39

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   5.00
 LONGEST FLOWPATH FROM NODE    701.00 TO NODE    703.00 =  2150.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    703.00 TO NODE    704.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   535.20  DOWNSTREAM(FEET) =   531.69
 FLOW LENGTH(FEET) =   103.70   MANNING'S N =  0.024
 DEPTH OF FLOW IN  84.0 INCH PIPE IS  12.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.94
 GIVEN PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     27.39
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =  16.95
 LONGEST FLOWPATH FROM NODE    701.00 TO NODE    704.00 =  2253.70 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    704.00 TO NODE    705.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    531.69  DOWNSTREAM(FEET) =    395.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  3700.00   CHANNEL SLOPE =  0.0369
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.860
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  78
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     46.25
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.48
 AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =  13.76
 Tc(MIN.) =  30.70
 SUBAREA AREA(ACRES) =    36.70       SUBAREA RUNOFF(CFS) =   36.74
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.368
 TOTAL AREA(ACRES) =     52.50        PEAK FLOW RATE(CFS) =      55.25

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   4.79
 LONGEST FLOWPATH FROM NODE    701.00 TO NODE    705.00 =  5953.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    705.00 TO NODE    706.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   387.18
 FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.024
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.59
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     55.25
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  30.76
 LONGEST FLOWPATH FROM NODE    701.00 TO NODE    706.00 =  6009.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    706.00 TO NODE    706.00 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.) =  30.76
 RAINFALL INTENSITY(INCH/HR) =   2.86
 TOTAL STREAM AREA(ACRES) =    52.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     55.25

****************************************************************************
 FLOW PROCESS FROM NODE    707.00 TO NODE    708.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    520.00
  DOWNSTREAM ELEVATION(FEET) =    500.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

********************************************************************************
  FLOW PROCESS FROM NODE    708.00 TO NODE    706.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    397.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00   CHANNEL SLOPE =  0.1078
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.716
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  78
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.23
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   3.74
  Tc(MIN.) =   8.17
  SUBAREA AREA(ACRES) =     5.30       SUBAREA RUNOFF(CFS) =   12.46
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =      5.40         PEAK FLOW RATE(CFS) =      12.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   5.21
  LONGEST FLOWPATH FROM NODE    707.00 TO NODE    706.00 =  1000.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    706.00 TO NODE    706.00 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.) =   8.17
  RAINFALL INTENSITY(INCH/HR) =   6.72
  TOTAL STREAM AREA(ACRES) =     5.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.69

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        55.25     30.76        2.857         52.50
     2        12.69      8.17        6.716          5.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1        27.38      8.17        6.716
     2        60.65     30.76        2.857

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     60.65   Tc(MIN.) =   30.76
  TOTAL AREA(ACRES) =     57.90
  LONGEST FLOWPATH FROM NODE    701.00 TO NODE    706.00 =  6009.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    706.00 TO NODE    709.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   387.11  DOWNSTREAM(FEET) =   386.20
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.024
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.31
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     60.65
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  30.83
  LONGEST FLOWPATH FROM NODE    701.00 TO NODE    709.00 =  6099.70 FEET.

+----------------------------------------------------------------------------+
| FLOW EXITS EX. 24" CMP AND DISCHARGES ONTO EX. TERRAIN S'LY OF CANONITA    |
| ROAD                                                                       |
|                                                                            |
+----------------------------------------------------------------------------+
```

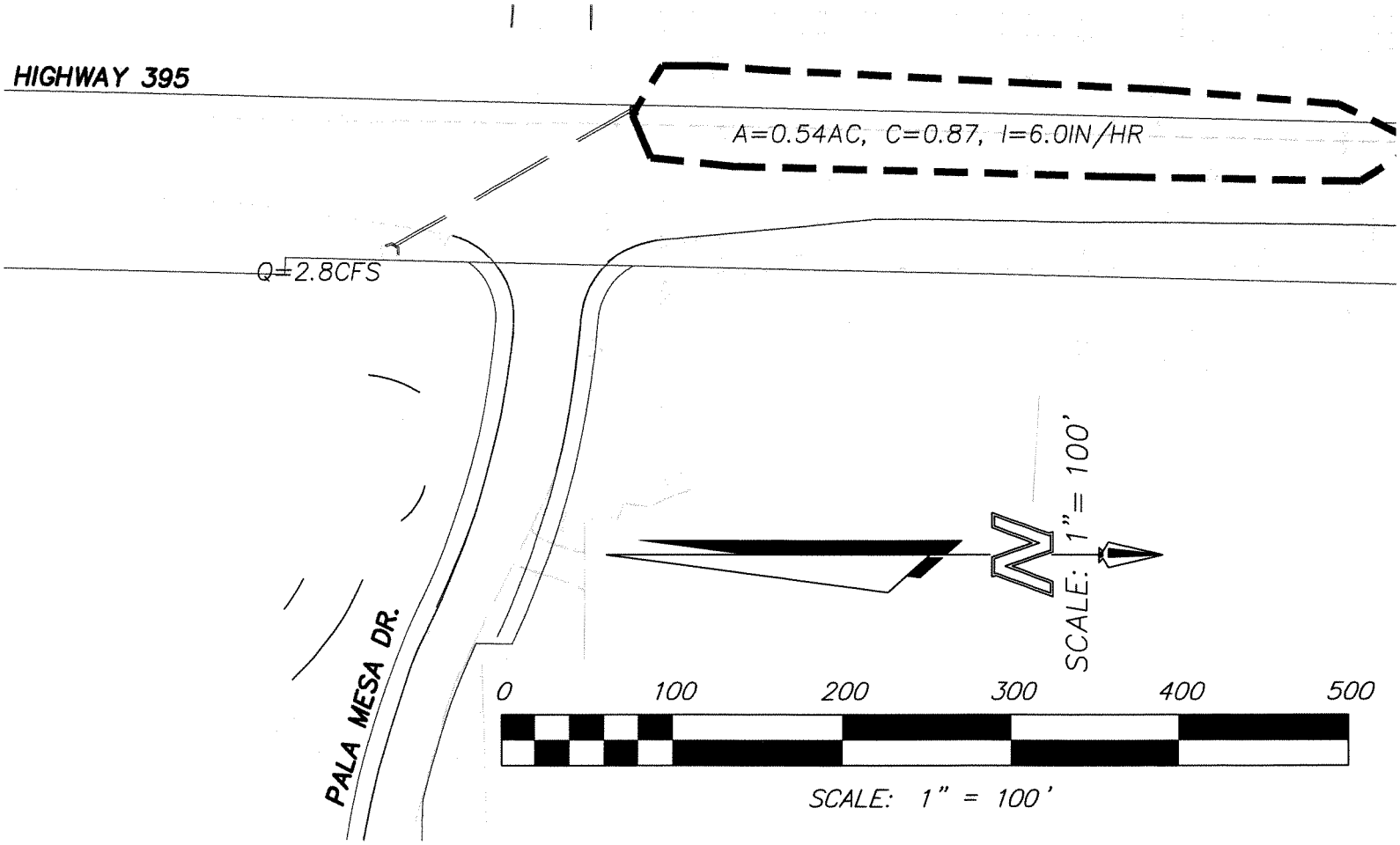
OFF-SITE INTERSECTION:

PALA MESA DRIVE @ OLD HIGHWAY 395

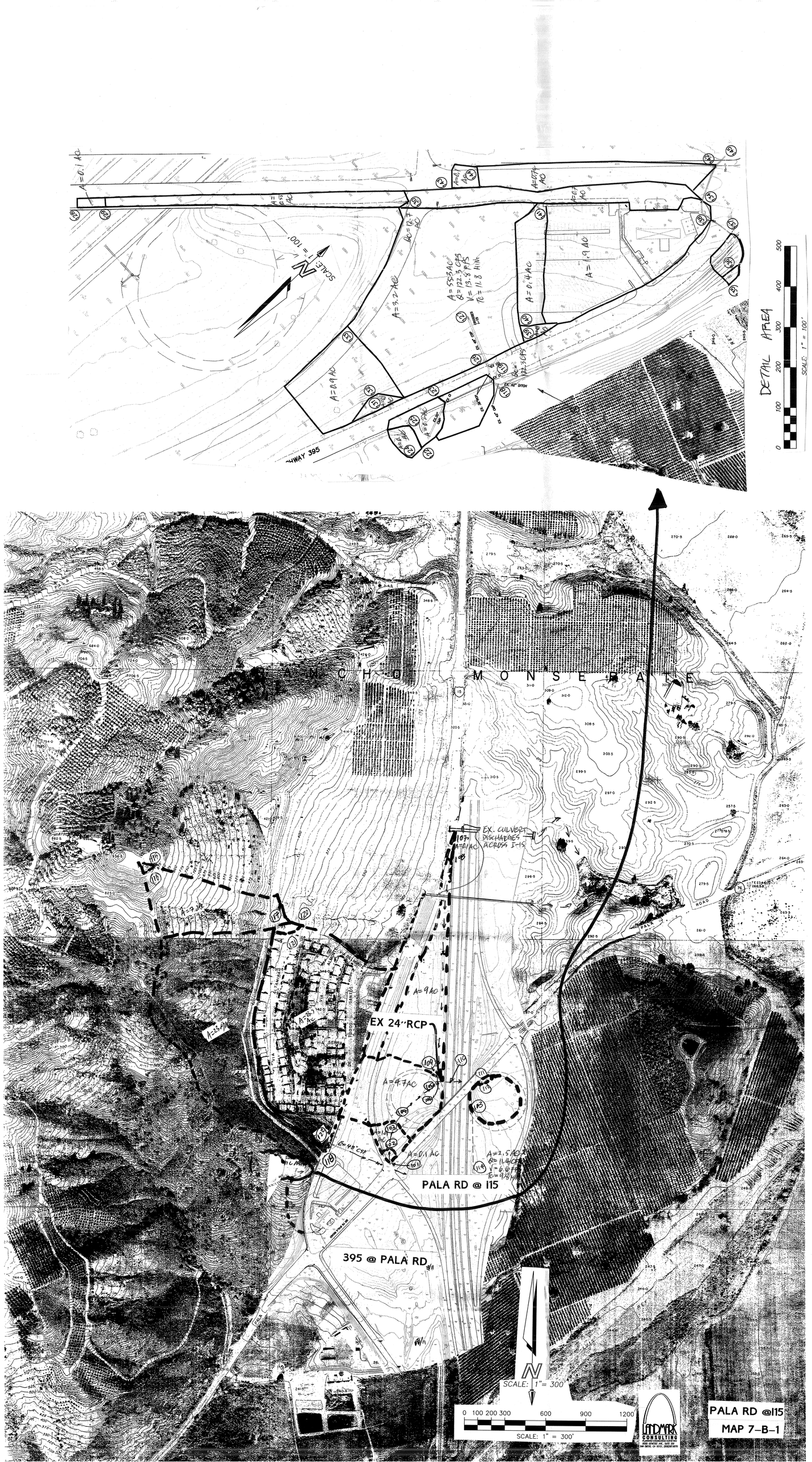
Q = C I A

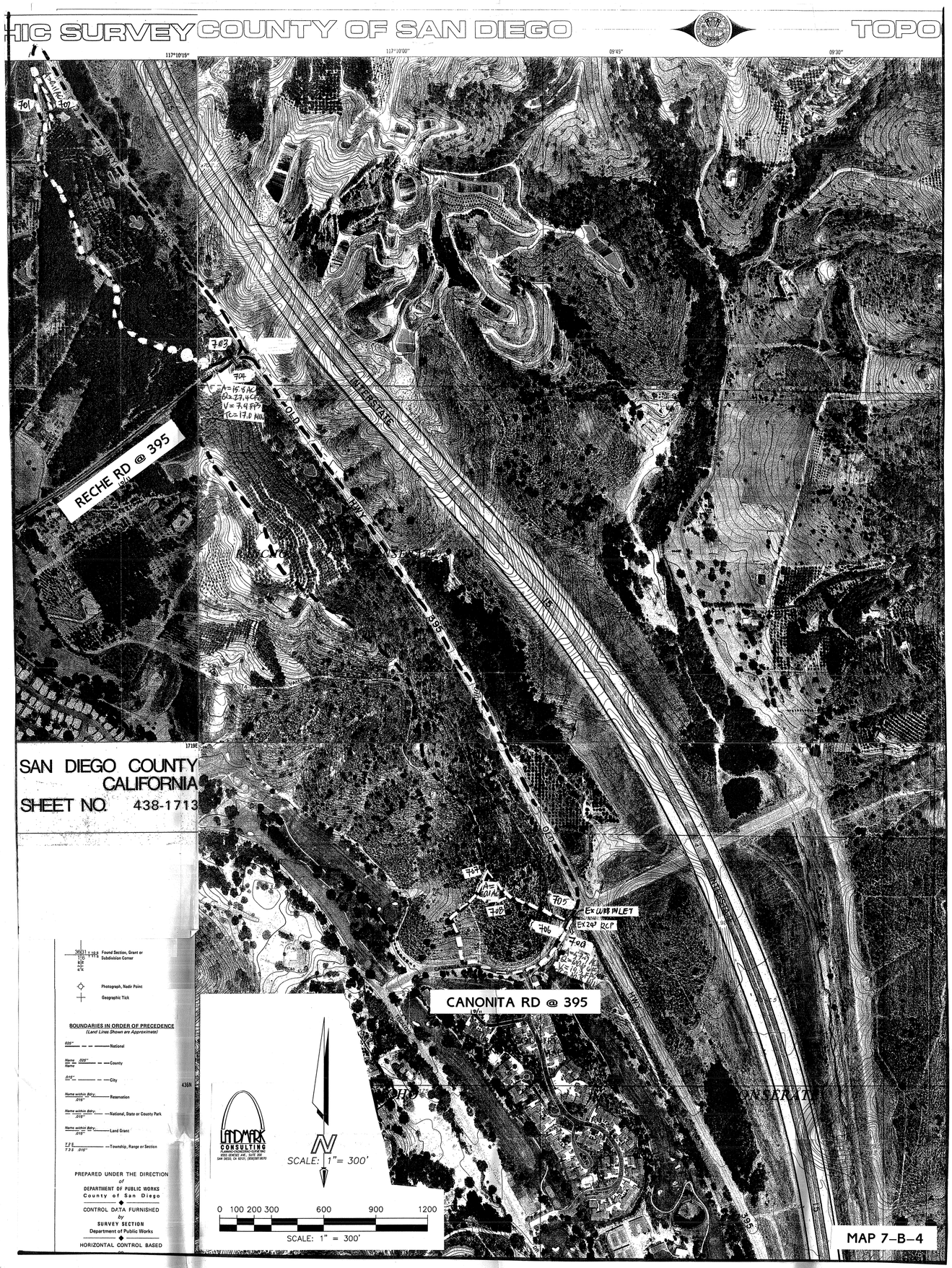
A = 0.54 Ac
C = 0.87 (roadway)
I = 6.0 in/hr

Q = 2.8 cfs, discharged into the existing drainage ditch along the westerly side of Old Highway 395 via a proposed 18' RCP crossing Old Highway 395.



SECTION 7B:
OFF-SITE INTERSECTIONS HYDROLOGY MAPS


DETAIL AREA
SCALE: 1" = 100'
0
100
200
300
400
500
SCALE 1" = 100'
A=0.1 AC
A=0.9 AC
A=3.2 AC
A=55.3AC
Q=122.3 CFS
V=13.3 FPS
TC=11.8 MIN
A=1.4 AC
A=1.9 AC
A=0.7 AC
A=0.1 AC
A=0.9 AC
A=0.1 AC
A=0.1 AC
A=0.1


HIC SURVEY
COUNTY OF SAN DIEGO
TOPO
117°10'15"
117°10'00"
09'45"
09'30"
RECHE RD @ 395
OLD HIGHWAY 395
CANONITA RD @ 395
EX U/G INLET
EX 24" RCP
SAN DIEGO COUNTY
CALIFORNIA
SHEET NO. 438-1713
Found Section, Grant or Subdivision Corner
Photograph, Nadir Point
Geographic Tick
BOUNDARIES IN ORDER OF PRECEDENCE
(Land Lines Shown are Approximate)
National
County
City
Reservation
National, State or County Park
Land Grant
Township, Range or Section
PREPARED UNDER THE DIRECTION
of
DEPARTMENT OF PUBLIC WORKS
County of San Diego
CONTROL DATA FURNISHED
by
SURVEY SECTION
Department of Public Works
HORIZONTAL CONTROL BASED
LANDMARK CONSULTING
SCALE: 1"= 300'
0 100 200 300 600 900 1200
SCALE: 1" = 300'
MAP 7-B-4

SECTION 8:
HORSE RANCH CREEK 100-YEAR NCRS HYDROLOGIC METHOD

SECTION 8A:
HEC HMS ANALYSIS FOR
PRE AND POST-DEVELOPMENT CONDITIONS

Project	Campus Park	**Date**	07/29/09
Client	Landmark Consulting		
Subject	HEC-HMS Input Parameters		

Pre-Development Condition HEC-HMS Model Input

Subarea	Area (acres)	Area (mi^2)	NRCS Lag (min)	CN (PZN 2.0)	CN (PZN 2.8)	I_A (inches)
AB	5853	9.146	46.8	79.2	88.6	0.26
C	1490	2.329	20.6	76.1	86.4	0.31
Total	7344	11.47				

Post-Development Condition HEC-HMS Model Input

Subarea	Area (acres)	Area (mi^2)	NRCS Lag (min)	CN (PZN 2.0)	CN (PZN 2.8)	I_A (inches)
AB-Rev	5887	9.199	46.8	79.4	88.7	0.26
C-Rev	1137	1.777	20.6	77.3	86.9	0.30
Onsite	360	0.563	10.1	80.9	89.7	0.23
Total	7385	11.54				

PZN Interpolation Values

2.0	3.0	2.8
76	89	86.4
77	89	86.6
78	90	87.6
79	91	88.6
80	91	88.8
81	92	89.8

Notes:

1) PZN of 2.8 used for 100-year storm based on site PZN of 1.8

2) Area increase of 41 acres to account for development along Hwy 76 near the Pankey Bridge.

Project	Campus Park	**Date**	7/29/09
Client	Landmark Consulting		
Subject	Basin Lag Calculations		

$$T_l = 24 \cdot \bar{n} \cdot \left(\frac{L \cdot L_c}{s^{0.5}} \right)^m$$

Where: T_l = Army Corps of Engineers' Lag Time (hrs)

n = Average Manning's n for watercourse

L = Length of longest watercourse (miles)

L_c = Length along longest watercourse to point opposite centroid (miles)

s = Overall slope of drainage area (feet per mile)

m = Regional constant, equal to 0.38 for San Diego County

Lag Time Calculations

Basin	Upper Elev. (ft)	Lower Elev. (ft)	Length (ft)	Length (mi)	Slope (ft/mi)	Length to Centroid (ft)	Length to Centroid (mi)	Basin "n" Value*	Corps Lag (min)	Tp (min)	0.2 x Tp (min)	D (min)	NRCS Lag (min)
AB	1930	340	27171	5.15	309	9854	1.87	0.050	57.2	49.3	9.9	5.0	46.8
C	880	270	10603	2.01	304	3403	0.64	0.050	26.8	23.1	4.6	5.0	20.6
Onsite	Rational Method Tc at Node 322 (Onsite Study) = 18.3 min, Lag=80% of Tc (Eq 4-24) =								14.6	12.6	2.5	5.0	10.1

Notes:

1) Basin "n" for AB-Rev and C-Rev are same as AB and C in the existing condition since there will be no or minimal improvements in those sub-basins

2) Basin "n" of 0.05 was assumed to be representative of the land use and natural water courses in the watershed. The area is rugged with steep canyons. There is also considerable vegetation in the channels. Ground cover includes chapparal and orchards.

Project	Campus Park	**Date**	05/12/09
Client	Landmark Consulting		
Subject	HEC-HMS Reach Values		

Pre-Development Reaches

HMS Name	U/S Elev. (ft)	D/S Elev. (ft)	Length (ft)	Slope	Manning's n	Shape	Width (ft)	Side Slope
AB	325	262	8308	0.0076	0.06	Trap	800	5:1

(*) Note: Width is based on HEC-RAS Section 7145

Project	Campus Park	**Date**	08/05/09
Client	Landmark Consulting		
Subject	Preliminary Outlet Design for Campus Park Detention Basin		

Tailwater Condition

Initial Condition:	Elevation
Initial Elevation	264.1
Tailwater	Fixed
Stage	273.2
Outlets	1
Spillways	1

Outlet Configuration

Type	Culvert	
Shape	Circular	
Chart	1	
Scale	2	
Length	20	ft
Diameter	3	ft
Inlet	264	ft
Entrance loss	0.2	
Outlet Elev.	263.8	ft
Outlet loss	1	
Manning's	0.013	

Spillway Configuration

Type	Broad	
Elev.	272.5	ft
Length	500	ft
Coeff.	3.3	

Detention Basin Storage Volume

ELEV	AREA	VOL	VOL CUM
(ft)	(ft^2)	(ft^3)	(ac-ft)
264	2970	0	0.00
266	25989	28959	0.66
268	50374	76363	2.42
270	68426	118800	5.15
272	73899	142325	8.41
274	79474	153373	11.93

San Diego County Nested Storm Distribution for 5 minute period of maximum intensity
Project: Horse Ranch Creek through Campus Park Development

Precipitation Data Input

6-hr rainfall = 3.50 inches
24-hr rainfall = 6.00 inches
P6/P24 = 58%
Computation Interval = 5 minutes

Depth-Area Reduction Factor Input

Watershed Area 11.54 mi^2

Duration	Factor
30	0.890
60	0.940
180	0.967
360	0.977
1440	0.983

Time	Time Increment	Duration min.	Duration hr.	Cumulative Precip in order of Increasing Duration	Increm. Precip in.	Depth Area Reduction Factor	Adjusted Precip	% of Pt	Rainfall distribution %cumulativ	Incremental Precip in order of Distribution	Adjusted Incremental Precip in order of Distribution
0:00	0	0	0	0	0	0.890	0	0	0	0	0
0:05	1	5		0.768	0.768	0.890	0.684	0.1281	0.1280775	0.008	0.008
0:10	2	10	0.2	0.983	0.214	0.890	0.191	0.0357	0.1638093	0.008	0.008
0:15	3	15		1.135	0.152	0.890	0.135	0.0254	0.1891694	0.008	0.008
0:20	4	20	0.3	1.257	0.122	0.890	0.109	0.0203	0.2095097	0.008	0.008
0:25	5	25		1.361	0.104	0.890	0.092	0.0173	0.2267813	0.008	0.008
0:30	6	30	0.5	1.452	0.091	0.890	0.081	0.0152	0.2419449	0.008	0.008
0:35	7	35		1.533	0.082	0.898	0.073	0.0136	0.255554	0.008	0.008
0:40	8	40	0.7	1.608	0.074	0.906	0.067	0.0124	0.2679599	0.008	0.008
0:45	9	45		1.676	0.069	0.915	0.063	0.0114	0.2794016	0.008	0.008
0:50	10	50	0.8	1.740	0.064	0.923	0.059	0.0106	0.29005	0.008	0.008
0:55	11	55		1.800	0.060	0.931	0.056	0.01	0.3000318	0.008	0.008
1:00	12	60	1.0	1.857	0.056	0.940	0.053	0.0094	0.3094441	0.008	0.008
1:05	13	65		1.910	0.054	0.941	0.050	0.0089	0.3183631	0.008	0.008
1:10	14	70	1.2	1.961	0.051	0.942	0.048	0.0085	0.3268498	0.008	0.008
1:15	15	75		2.010	0.049	0.943	0.046	0.0081	0.334954	0.008	0.008
1:20	16	80	1.3	2.056	0.047	0.944	0.044	0.0078	0.3427168	0.009	0.008
1:25	17	85		2.101	0.045	0.945	0.042	0.0075	0.3501726	0.009	0.008
1:30	18	90	1.5	2.144	0.043	0.947	0.041	0.0072	0.3573506	0.009	0.008
1:35	19	95		2.186	0.042	0.948	0.039	0.0069	0.3642758	0.009	0.008
1:40	20	100	1.7	2.226	0.040	0.949	0.038	0.0067	0.3709697	0.009	0.008
1:45	21	105		2.265	0.039	0.950	0.037	0.0065	0.3774511	0.009	0.009
1:50	22	110	1.8	2.302	0.038	0.951	0.036	0.0063	0.3837363	0.009	0.009
1:55	23	115		2.339	0.037	0.952	0.035	0.0061	0.3898398	0.009	0.009
2:00	24	120	2.0	2.375	0.036	0.953	0.034	0.0059	0.3957745	0.009	0.009
2:05	25	125		2.409	0.035	0.955	0.033	0.0058	0.4015518	0.009	0.009
2:10	26	130	2.2	2.443	0.034	0.956	0.032	0.0056	0.4071818	0.009	0.009
2:15	27	135		2.476	0.033	0.957	0.032	0.0055	0.4126739	0.009	0.009
2:20	28	140	2.3	2.508	0.032	0.958	0.031	0.0054	0.4180362	0.009	0.009
2:25	29	145		2.540	0.031	0.959	0.030	0.0052	0.4232765	0.009	0.009
2:30	30	150	2.5	2.570	0.031	0.960	0.030	0.0051	0.4284014	0.009	0.009
2:35	31	155		2.601	0.030	0.962	0.029	0.005	0.4334173	0.009	0.009
2:40	32	160	2.7	2.630	0.029	0.963	0.028	0.0049	0.4383299	0.009	0.009
2:45	33	165		2.659	0.029	0.964	0.028	0.0048	0.4431444	0.009	0.009
2:50	34	170	2.8	2.687	0.028	0.965	0.027	0.0047	0.4478657	0.009	0.009
2:55	35	175		2.715	0.028	0.966	0.027	0.0046	0.4524983	0.009	0.009
3:00	36	180	3.0	2.742	0.027	0.967	0.026	0.0045	0.4570463	0.009	0.009
3:05	37	185		2.769	0.027	0.968	0.026	0.0045	0.4615135	0.009	0.009
3:10	38	190	3.2	2.795	0.026	0.968	0.025	0.0044	0.4659035	0.009	0.009
3:15	39	195		2.821	0.026	0.968	0.025	0.0043	0.4702196	0.009	0.009
3:20	40	200	3.3	2.847	0.025	0.968	0.025	0.0042	0.4744649	0.009	0.009

Time	Time Incre-ment	Duration min.	hr.	Cumulative Precip in order of Increasing Duration	Increm. Precip in.	Depth Area Reduction Factor	Adjusted Precip	% of Pt	Rainfall distri-bution %cumulativ	Incremental Precip in order of Distribution	Adjusted Incremental Precip in order of Distribution
3:25	41	205		2.872	0.025	0.969	0.024	0.0042	0.4786423	0.009	0.009
3:30	42	210	3.5	2.897	0.025	0.969	0.024	0.0041	0.4827545	0.009	0.009
3:35	43	215		2.921	0.024	0.969	0.024	0.004	0.486804	0.009	0.009
3:40	44	220	3.7	2.945	0.024	0.969	0.023	0.004	0.4907932	0.009	0.009
3:45	45	225		2.968	0.024	0.970	0.023	0.0039	0.4947243	0.010	0.009
3:50	46	230	3.8	2.992	0.023	0.970	0.023	0.0039	0.4985995	0.010	0.009
3:55	47	235		3.015	0.023	0.970	0.022	0.0038	0.5024208	0.010	0.009
4:00	48	240	4.0	3.037	0.023	0.971	0.022	0.0038	0.5061899	0.010	0.009
4:05	49	245		3.059	0.022	0.971	0.022	0.0037	0.5099087	0.010	0.009
4:10	50	250	4.2	3.081	0.022	0.971	0.021	0.0037	0.5135789	0.010	0.010
4:15	51	255		3.103	0.022	0.971	0.021	0.0036	0.5172021	0.010	0.010
4:20	52	260	4.3	3.125	0.021	0.972	0.021	0.0036	0.5207797	0.010	0.010
4:25	53	265		3.146	0.021	0.972	0.021	0.0035	0.5243132	0.010	0.010
4:30	54	270	4.5	3.167	0.021	0.972	0.020	0.0035	0.5278039	0.010	0.010
4:35	55	275		3.188	0.021	0.973	0.020	0.0034	0.5312532	0.010	0.010
4:40	56	280	4.7	3.208	0.020	0.973	0.020	0.0034	0.5346623	0.010	0.010
4:45	57	285		3.228	0.020	0.973	0.020	0.0034	0.5380324	0.010	0.010
4:50	58	290	4.8	3.248	0.020	0.973	0.019	0.0033	0.5413645	0.010	0.010
4:55	59	295		3.268	0.020	0.974	0.019	0.0033	0.5446598	0.010	0.010
5:00	60	300	5.0	3.288	0.020	0.974	0.019	0.0033	0.5479192	0.010	0.010
5:05	61	305		3.307	0.019	0.974	0.019	0.0032	0.5511438	0.010	0.010
5:10	62	310	5.2	3.326	0.019	0.975	0.019	0.0032	0.5543345	0.010	0.010
5:15	63	315		3.345	0.019	0.975	0.018	0.0032	0.5574921	0.010	0.010
5:20	64	320	5.3	3.364	0.019	0.975	0.018	0.0031	0.5606176	0.010	0.010
5:25	65	325		3.382	0.019	0.975	0.018	0.0031	0.5637117	0.010	0.010
5:30	66	330	5.5	3.401	0.018	0.976	0.018	0.0031	0.5667753	0.010	0.010
5:35	67	335		3.419	0.018	0.976	0.018	0.003	0.5698091	0.010	0.010
5:40	68	340	5.7	3.437	0.018	0.976	0.018	0.003	0.5728138	0.011	0.010
5:45	69	345		3.455	0.018	0.977	0.017	0.003	0.5757902	0.011	0.010
5:50	70	350	5.8	3.472	0.018	0.977	0.017	0.0029	0.5787388	0.011	0.010
5:55	71	355		3.490	0.018	0.977	0.017	0.0029	0.5816605	0.011	0.010
6:00	72	360	6.0	3.500	0.010	0.977	0.010	0.0017	0.5833333	0.011	0.011
6:05	73	365		3.519	0.019	0.977	0.018	0.0031	0.5864701	0.011	0.011
6:10	74	370	6.2	3.537	0.019	0.977	0.018	0.0031	0.5895807	0.011	0.011
6:15	75	375		3.556	0.019	0.977	0.018	0.0031	0.5926657	0.011	0.011
6:20	76	380	6.3	3.574	0.018	0.977	0.018	0.0031	0.5957257	0.011	0.011
6:25	77	385		3.593	0.018	0.978	0.018	0.003	0.5987612	0.011	0.011
6:30	78	390	6.5	3.611	0.018	0.978	0.018	0.003	0.6017726	0.011	0.011
6:35	79	395		3.629	0.018	0.978	0.018	0.003	0.6047606	0.011	0.011
6:40	80	400	6.7	3.646	0.018	0.978	0.017	0.003	0.6077255	0.011	0.011
6:45	81	405		3.664	0.018	0.978	0.017	0.0029	0.6106679	0.011	0.011
6:50	82	410	6.8	3.682	0.018	0.978	0.017	0.0029	0.6135881	0.011	0.011
6:55	83	415		3.699	0.017	0.978	0.017	0.0029	0.6164867	0.011	0.011
7:00	84	420	7.0	3.716	0.017	0.978	0.017	0.0029	0.619364	0.011	0.011
7:05	85	425		3.733	0.017	0.978	0.017	0.0029	0.6222204	0.012	0.011
7:10	86	430	7.2	3.750	0.017	0.978	0.017	0.0028	0.6250564	0.012	0.011
7:15	87	435		3.767	0.017	0.978	0.017	0.0028	0.6278723	0.012	0.011
7:20	88	440	7.3	3.784	0.017	0.978	0.016	0.0028	0.6306685	0.012	0.011

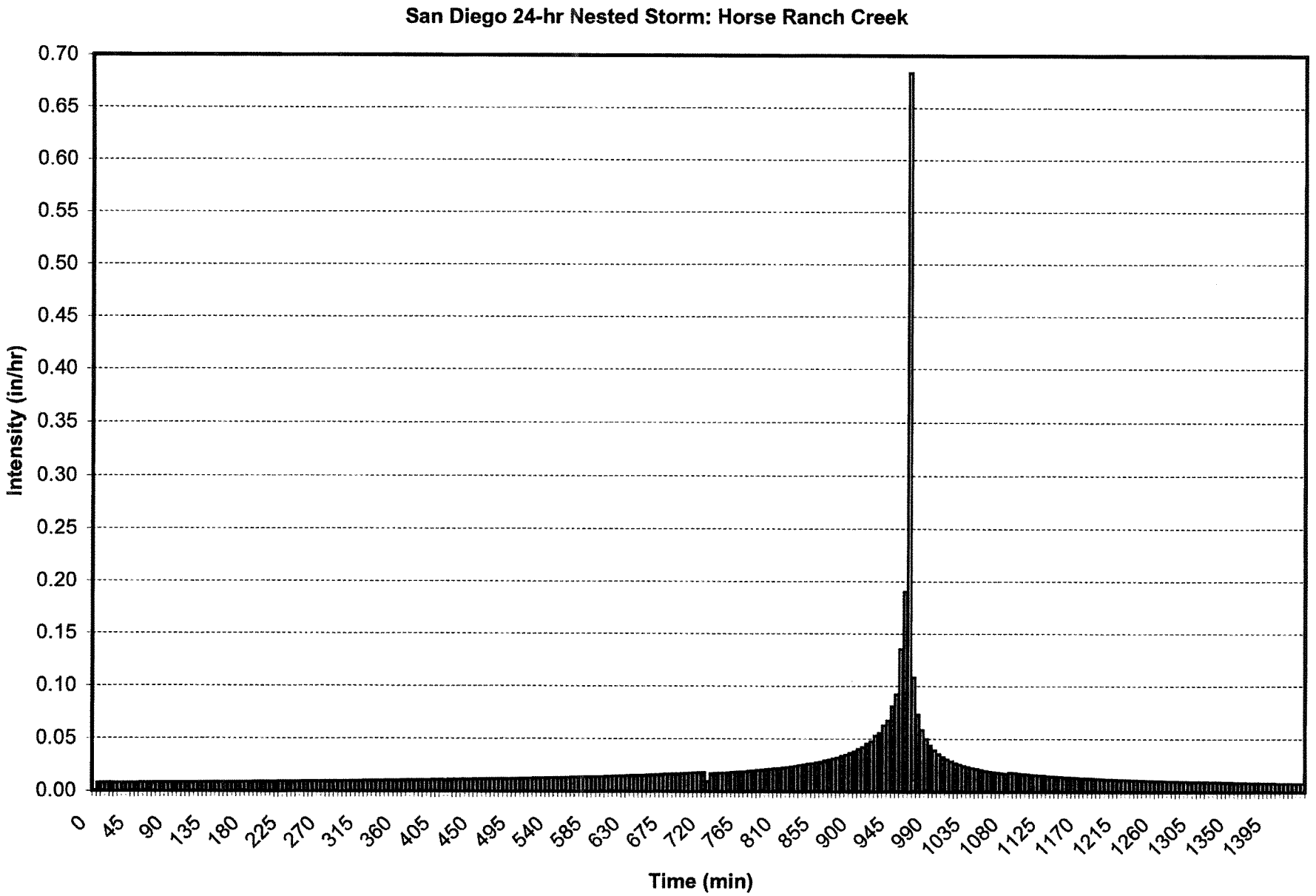
Time	Time Incre-ment	Duration min.	hr.	Cumulative Precip in order of Increasing Duration	Increm. Precip in.	Depth Area Reduction Factor	Adjusted Precip	% of Pt	Rainfall distri-bution %cumulative	Incremental Precip in order of Distribution	Adjusted Incremental Precip in order of Distribution
7:25	89	445		3.801	0.017	0.978	0.016	0.0028	0.6334453	0.012	0.012
7:30	90	450	7.5	3.817	0.017	0.978	0.016	0.0028	0.6362031	0.012	0.012
7:35	91	455		3.834	0.016	0.978	0.016	0.0027	0.6389422	0.012	0.012
7:40	92	460	7.7	3.850	0.016	0.978	0.016	0.0027	0.641663	0.012	0.012
7:45	93	465		3.866	0.016	0.978	0.016	0.0027	0.6443658	0.012	0.012
7:50	94	470	7.8	3.882	0.016	0.978	0.016	0.0027	0.6470509	0.012	0.012
7:55	95	475		3.898	0.016	0.978	0.016	0.0027	0.6497186	0.012	0.012
8:00	96	480	8.0	3.914	0.016	0.978	0.016	0.0027	0.6523692	0.012	0.012
8:05	97	485		3.930	0.016	0.978	0.015	0.0026	0.655003	0.012	0.012
8:10	98	490	8.2	3.946	0.016	0.978	0.015	0.0026	0.6576202	0.012	0.012
8:15	99	495		3.961	0.016	0.978	0.015	0.0026	0.6602211	0.013	0.012
8:20	100	500	8.3	3.977	0.016	0.978	0.015	0.0026	0.662806	0.013	0.012
8:25	101	505		3.992	0.015	0.978	0.015	0.0026	0.6653752	0.013	0.012
8:30	102	510	8.5	4.008	0.015	0.978	0.015	0.0026	0.6679289	0.013	0.013
8:35	103	515		4.023	0.015	0.978	0.015	0.0025	0.6704673	0.013	0.013
8:40	104	520	8.7	4.038	0.015	0.978	0.015	0.0025	0.6729907	0.013	0.013
8:45	105	525		4.053	0.015	0.978	0.015	0.0025	0.6754994	0.013	0.013
8:50	106	530	8.8	4.068	0.015	0.978	0.015	0.0025	0.6779934	0.013	0.013
8:55	107	535		4.083	0.015	0.978	0.015	0.0025	0.6804731	0.013	0.013
9:00	108	540	9.0	4.098	0.015	0.978	0.014	0.0025	0.6829387	0.013	0.013
9:05	109	545		4.112	0.015	0.978	0.014	0.0025	0.6853904	0.013	0.013
9:10	110	550	9.2	4.127	0.015	0.978	0.014	0.0024	0.6878284	0.014	0.013
9:15	111	555		4.142	0.015	0.978	0.014	0.0024	0.6902528	0.014	0.013
9:20	112	560	9.3	4.156	0.014	0.979	0.014	0.0024	0.692664	0.014	0.013
9:25	113	565		4.170	0.014	0.979	0.014	0.0024	0.695062	0.014	0.014
9:30	114	570	9.5	4.185	0.014	0.979	0.014	0.0024	0.6974471	0.014	0.014
9:35	115	575		4.199	0.014	0.979	0.014	0.0024	0.6998195	0.014	0.014
9:40	116	580	9.7	4.213	0.014	0.979	0.014	0.0024	0.7021792	0.014	0.014
9:45	117	585		4.227	0.014	0.979	0.014	0.0023	0.7045266	0.014	0.014
9:50	118	590	9.8	4.241	0.014	0.979	0.014	0.0023	0.7068617	0.014	0.014
9:55	119	595		4.255	0.014	0.979	0.014	0.0023	0.7091848	0.015	0.014
10:00	120	600	10.0	4.269	0.014	0.979	0.014	0.0023	0.7114959	0.015	0.014
10:05	121	605		4.283	0.014	0.979	0.014	0.0023	0.7137954	0.015	0.014
10:10	122	610	10.2	4.296	0.014	0.979	0.013	0.0023	0.7160832	0.015	0.015
10:15	123	615		4.310	0.014	0.979	0.013	0.0023	0.7183596	0.015	0.015
10:20	124	620	10.3	4.324	0.014	0.979	0.013	0.0023	0.7206247	0.015	0.015
10:25	125	625		4.337	0.014	0.979	0.013	0.0023	0.7228787	0.015	0.015
10:30	126	630	10.5	4.351	0.013	0.979	0.013	0.0022	0.7251217	0.015	0.015
10:35	127	635		4.364	0.013	0.979	0.013	0.0022	0.7273538	0.016	0.015
10:40	128	640	10.7	4.377	0.013	0.979	0.013	0.0022	0.7295753	0.016	0.015
10:45	129	645		4.391	0.013	0.979	0.013	0.0022	0.7317861	0.016	0.016
10:50	130	650	10.8	4.404	0.013	0.979	0.013	0.0022	0.7339865	0.016	0.016
10:55	131	655		4.417	0.013	0.979	0.013	0.0022	0.7361766	0.016	0.016

Time	Time Incre-ment	Duration min.	hr.	Cumulative Precip in order of Increasing Duration	Increm. Precip in.	Depth Area Reduction Factor	Adjusted Precip	% of Pt	Rainfall distri-bution %cumulativ	Incremental Precip in order of Distribution	Adjusted Incremental Precip in order of Distribution
11:00	132	660	11.0	4.430	0.013	0.979	0.013	0.0022	0.7383564	0.016	0.016
11:05	133	665		4.443	0.013	0.979	0.013	0.0022	0.7405262	0.017	0.016
11:10	134	670	11.2	4.456	0.013	0.979	0.013	0.0022	0.7426861	0.017	0.016
11:15	135	675		4.469	0.013	0.979	0.013	0.0022	0.7448361	0.017	0.017
11:20	136	680	11.3	4.482	0.013	0.979	0.013	0.0021	0.7469764	0.017	0.017
11:25	137	685		4.495	0.013	0.979	0.013	0.0021	0.7491071	0.017	0.017
11:30	138	690	11.5	4.507	0.013	0.979	0.012	0.0021	0.7512284	0.017	0.017
11:35	139	695		4.520	0.013	0.979	0.012	0.0021	0.7533402	0.018	0.017
11:40	140	700	11.7	4.533	0.013	0.979	0.012	0.0021	0.7554428	0.018	0.017
11:45	141	705		4.545	0.013	0.979	0.012	0.0021	0.7575362	0.018	0.018
11:50	142	710	11.8	4.558	0.013	0.979	0.012	0.0021	0.7596206	0.018	0.018
11:55	143	715		4.570	0.012	0.979	0.012	0.0021	0.761696	0.019	0.018
12:00	144	720	12.0	4.583	0.012	0.979	0.012	0.0021	0.7637626	0.019	0.018
12:05	145	725		4.595	0.012	0.979	0.012	0.0021	0.7658204	0.010	0.010
12:10	146	730	12.2	4.607	0.012	0.979	0.012	0.002	0.7678696	0.018	0.017
12:15	147	735		4.619	0.012	0.979	0.012	0.002	0.7699102	0.018	0.017
12:20	148	740	12.3	4.632	0.012	0.980	0.012	0.002	0.7719423	0.018	0.018
12:25	149	745		4.644	0.012	0.980	0.012	0.002	0.7739661	0.018	0.018
12:30	150	750	12.5	4.656	0.012	0.980	0.012	0.002	0.7759816	0.019	0.018
12:35	151	755		4.668	0.012	0.980	0.012	0.002	0.7779889	0.019	0.018
12:40	152	760	12.7	4.680	0.012	0.980	0.012	0.002	0.779988	0.019	0.019
12:45	153	765		4.692	0.012	0.980	0.012	0.002	0.7819792	0.020	0.019
12:50	154	770	12.8	4.704	0.012	0.980	0.012	0.002	0.7839624	0.020	0.019
12:55	155	775		4.716	0.012	0.980	0.012	0.002	0.7859377	0.020	0.020
13:00	156	780	13.0	4.727	0.012	0.980	0.012	0.002	0.7879053	0.020	0.020
13:05	157	785		4.739	0.012	0.980	0.012	0.002	0.7898652	0.021	0.020
13:10	158	790	13.2	4.751	0.012	0.980	0.011	0.002	0.7918175	0.021	0.021
13:15	159	795		4.763	0.012	0.980	0.011	0.0019	0.7937622	0.022	0.021
13:20	160	800	13.3	4.774	0.012	0.980	0.011	0.0019	0.7956995	0.022	0.021
13:25	161	805		4.786	0.012	0.980	0.011	0.0019	0.7976294	0.023	0.022
13:30	162	810	13.5	4.797	0.012	0.980	0.011	0.0019	0.799552	0.023	0.022
13:35	163	815		4.809	0.011	0.980	0.011	0.0019	0.8014673	0.024	0.023
13:40	164	820	13.7	4.820	0.011	0.980	0.011	0.0019	0.8033755	0.024	0.023
13:45	165	825		4.832	0.011	0.980	0.011	0.0019	0.8052765	0.025	0.024
13:50	166	830	13.8	4.843	0.011	0.980	0.011	0.0019	0.8071706	0.025	0.024
13:55	167	835		4.854	0.011	0.980	0.011	0.0019	0.8090576	0.026	0.025
14:00	168	840	14.0	4.866	0.011	0.980	0.011	0.0019	0.8109378	0.026	0.025
14:05	169	845		4.877	0.011	0.980	0.011	0.0019	0.8128112	0.027	0.026
14:10	170	850	14.2	4.888	0.011	0.980	0.011	0.0019	0.8146778	0.028	0.027
14:15	171	855		4.899	0.011	0.980	0.011	0.0019	0.8165377	0.029	0.028
14:20	172	860	14.3	4.910	0.011	0.980	0.011	0.0019	0.8183909	0.029	0.028
14:25	173	865		4.921	0.011	0.980	0.011	0.0018	0.8202376	0.031	0.030
14:30	174	870	14.5	4.932	0.011	0.980	0.011	0.0018	0.8220778	0.031	0.030

Time	Time Incre-ment	Duration min.	hr.	Cumulative Precip in order of Increasing Duration	Increm. Precip in.	Depth Area Reduction Factor	Adjusted Precip	% of Pt	Rainfall distri-bution %cumulative	Incremental Precip in order of Distribution	Adjusted Incremental Precip in order of Distribution
14:35	175	875		4.943	0.011	0.980	0.011	0.0018	0.8239115	0.033	0.032
14:40	176	880	14.7	4.954	0.011	0.980	0.011	0.0018	0.8257388	0.034	0.032
14:45	177	885		4.965	0.011	0.980	0.011	0.0018	0.8275598	0.036	0.034
14:50	178	890	14.8	4.976	0.011	0.980	0.011	0.0018	0.8293746	0.037	0.035
14:55	179	895		4.987	0.011	0.980	0.011	0.0018	0.831183	0.039	0.037
15:00	180	900	15.0	4.998	0.011	0.980	0.011	0.0018	0.8329854	0.040	0.038
15:05	181	905		5.009	0.011	0.980	0.011	0.0018	0.8347816	0.043	0.041
15:10	182	910	15.2	5.019	0.011	0.980	0.011	0.0018	0.8365718	0.045	0.042
15:15	183	915		5.030	0.011	0.981	0.010	0.0018	0.8383559	0.049	0.046
15:20	184	920	15.3	5.041	0.011	0.981	0.010	0.0018	0.8401341	0.051	0.048
15:25	185	925		5.051	0.011	0.981	0.010	0.0018	0.8419065	0.056	0.053
15:30	186	930	15.5	5.062	0.011	0.981	0.010	0.0018	0.8436729	0.060	0.056
15:35	187	935		5.073	0.011	0.981	0.010	0.0018	0.8454336	0.069	0.063
15:40	188	940	15.7	5.083	0.011	0.981	0.010	0.0018	0.8471885	0.074	0.067
15:45	189	945		5.094	0.010	0.981	0.010	0.0017	0.8489378	0.091	0.081
15:50	190	950	15.8	5.104	0.010	0.981	0.010	0.0017	0.8506814	0.104	0.092
15:55	191	955		5.115	0.010	0.981	0.010	0.0017	0.8524193	0.152	0.135
16:00	192	960	16.0	5.125	0.010	0.981	0.010	0.0017	0.8541518	0.214	0.191
16:05	193	965		5.135	0.010	0.981	0.010	0.0017	0.8558787	0.768	0.684
16:10	194	970	16.2	5.146	0.010	0.981	0.010	0.0017	0.8576002	0.122	0.109
16:15	195	975		5.156	0.010	0.981	0.010	0.0017	0.8593162	0.082	0.073
16:20	196	980	16.3	5.166	0.010	0.981	0.010	0.0017	0.8610269	0.064	0.059
16:25	197	985		5.176	0.010	0.981	0.010	0.0017	0.8627323	0.054	0.050
16:30	198	990	16.5	5.187	0.010	0.981	0.010	0.0017	0.8644323	0.047	0.044
16:35	199	995		5.197	0.010	0.981	0.010	0.0017	0.8661272	0.042	0.039
16:40	200	1000	16.7	5.207	0.010	0.981	0.010	0.0017	0.8678168	0.038	0.036
16:45	201	1005		5.217	0.010	0.981	0.010	0.0017	0.8695013	0.035	0.033
16:50	202	1010	16.8	5.227	0.010	0.981	0.010	0.0017	0.8711807	0.032	0.031
16:55	203	1015		5.237	0.010	0.981	0.010	0.0017	0.872855	0.030	0.029
17:00	204	1020	17.0	5.247	0.010	0.981	0.010	0.0017	0.8745242	0.028	0.027
17:05	205	1025		5.257	0.010	0.981	0.010	0.0017	0.8761885	0.027	0.026
17:10	206	1030	17.2	5.267	0.010	0.981	0.010	0.0017	0.8778478	0.025	0.025
17:15	207	1035		5.277	0.010	0.981	0.010	0.0017	0.8795022	0.024	0.024
17:20	208	1040	17.3	5.287	0.010	0.981	0.010	0.0016	0.8811517	0.023	0.023
17:25	209	1045		5.297	0.010	0.981	0.010	0.0016	0.8827964	0.022	0.022
17:30	210	1050	17.5	5.307	0.010	0.981	0.010	0.0016	0.8844363	0.021	0.021
17:35	211	1055		5.316	0.010	0.981	0.010	0.0016	0.8860714	0.021	0.020
17:40	212	1060	17.7	5.326	0.010	0.981	0.010	0.0016	0.8877018	0.020	0.019
17:45	213	1065		5.336	0.010	0.981	0.010	0.0016	0.8893274	0.019	0.019
17:50	214	1070	17.8	5.346	0.010	0.981	0.010	0.0016	0.8909485	0.019	0.018
17:55	215	1075		5.355	0.010	0.981	0.010	0.0016	0.8925649	0.018	0.018
18:00	216	1080	18.0	5.365	0.010	0.981	0.009	0.0016	0.8941767	0.018	0.017
18:05	217	1085		5.375	0.010	0.981	0.009	0.0016	0.895784	0.019	0.018

Time	Time Incre-ment	Duration min.	hr.	Cumulative Precip in order of Increasing Duration	Increm. Precip in.	Depth Area Reduction Factor	Adjusted Precip	% of Pt	Rainfall distri-bution %cumulativ	Incremental Precip in order of Distribution	Adjusted Incremental Precip in order of Distribution
18:10	218	1090	18.2	5.384	0.010	0.981	0.009	0.0016	0.8973867	0.018	0.018
18:15	219	1095		5.394	0.010	0.982	0.009	0.0016	0.898985	0.018	0.018
18:20	220	1100	18.3	5.403	0.010	0.982	0.009	0.0016	0.9005788	0.018	0.017
18:25	221	1105		5.413	0.010	0.982	0.009	0.0016	0.9021681	0.017	0.017
18:30	222	1110	18.5	5.423	0.010	0.982	0.009	0.0016	0.9037531	0.017	0.016
18:35	223	1115		5.432	0.009	0.982	0.009	0.0016	0.9053337	0.016	0.016
18:40	224	1120	18.7	5.441	0.009	0.982	0.009	0.0016	0.9069101	0.016	0.016
18:45	225	1125		5.451	0.009	0.982	0.009	0.0016	0.9084821	0.016	0.015
18:50	226	1130	18.8	5.460	0.009	0.982	0.009	0.0016	0.9100498	0.016	0.015
18:55	227	1135		5.470	0.009	0.982	0.009	0.0016	0.9116133	0.015	0.015
19:00	228	1140	19.0	5.479	0.009	0.982	0.009	0.0016	0.9131726	0.015	0.015
19:05	229	1145		5.488	0.009	0.982	0.009	0.0016	0.9147278	0.015	0.014
19:10	230	1150	19.2	5.498	0.009	0.982	0.009	0.0016	0.9162787	0.014	0.014
19:15	231	1155		5.507	0.009	0.982	0.009	0.0015	0.9178256	0.014	0.014
19:20	232	1160	19.3	5.516	0.009	0.982	0.009	0.0015	0.9193684	0.014	0.014
19:25	233	1165		5.525	0.009	0.982	0.009	0.0015	0.9209071	0.014	0.014
19:30	234	1170	19.5	5.535	0.009	0.982	0.009	0.0015	0.9224418	0.014	0.013
19:35	235	1175		5.544	0.009	0.982	0.009	0.0015	0.9239725	0.013	0.013
19:40	236	1180	19.7	5.553	0.009	0.982	0.009	0.0015	0.9254992	0.013	0.013
19:45	237	1185		5.562	0.009	0.982	0.009	0.0015	0.927022	0.013	0.013
19:50	238	1190	19.8	5.571	0.009	0.982	0.009	0.0015	0.9285408	0.013	0.013
19:55	239	1195		5.580	0.009	0.982	0.009	0.0015	0.9300558	0.013	0.012
20:00	240	1200	20.0	5.589	0.009	0.982	0.009	0.0015	0.9315669	0.013	0.012
20:05	241	1205		5.598	0.009	0.982	0.009	0.0015	0.9330741	0.012	0.012
20:10	242	1210	20.2	5.607	0.009	0.982	0.009	0.0015	0.9345775	0.012	0.012
20:15	243	1215		5.616	0.009	0.982	0.009	0.0015	0.9360771	0.012	0.012
20:20	244	1220	20.3	5.625	0.009	0.982	0.009	0.0015	0.937573	0.012	0.012
20:25	245	1225		5.634	0.009	0.982	0.009	0.0015	0.9390651	0.012	0.012
20:30	246	1230	20.5	5.643	0.009	0.982	0.009	0.0015	0.9405535	0.012	0.011
20:35	247	1235		5.652	0.009	0.982	0.009	0.0015	0.9420382	0.011	0.011
20:40	248	1240	20.7	5.661	0.009	0.982	0.009	0.0015	0.9435193	0.011	0.011
20:45	249	1245		5.670	0.009	0.982	0.009	0.0015	0.9449966	0.011	0.011
20:50	250	1250	20.8	5.679	0.009	0.982	0.009	0.0015	0.9464704	0.011	0.011
20:55	251	1255		5.688	0.009	0.982	0.009	0.0015	0.9479406	0.011	0.011
21:00	252	1260	21.0	5.696	0.009	0.982	0.009	0.0015	0.9494072	0.011	0.011
21:05	253	1265		5.705	0.009	0.982	0.009	0.0015	0.9508702	0.011	0.011
21:10	254	1270	21.2	5.714	0.009	0.983	0.009	0.0015	0.9523297	0.011	0.010
21:15	255	1275		5.723	0.009	0.983	0.009	0.0015	0.9537857	0.011	0.010
21:20	256	1280	21.3	5.731	0.009	0.983	0.009	0.0015	0.9552383	0.010	0.010
21:25	257	1285		5.740	0.009	0.983	0.009	0.0014	0.9566873	0.010	0.010
21:30	258	1290	21.5	5.749	0.009	0.983	0.009	0.0014	0.9581329	0.010	0.010
21:35	259	1295		5.757	0.009	0.983	0.009	0.0014	0.9595751	0.010	0.010
21:40	260	1300	21.7	5.766	0.009	0.983	0.008	0.0014	0.9610139	0.010	0.010

Time	Time Incre-ment	Duration min.	hr.	Cumulative Precip in order of Increasing Duration	Increm. Precip in.	Depth Area Reduction Factor	Adjusted Precip	% of Pt	Rainfall distri-bution %cumulativ	Incremental Precip in order of Distribution	Adjusted Incremental Precip in order of Distribution
21:45	261	1305		5.775	0.009	0.983	0.008	0.0014	0.9624493	0.010	0.010
21:50	262	1310	21.8	5.783	0.009	0.983	0.008	0.0014	0.9638814	0.010	0.010
21:55	263	1315		5.792	0.009	0.983	0.008	0.0014	0.9653101	0.010	0.010
22:00	264	1320	22.0	5.800	0.009	0.983	0.008	0.0014	0.9667355	0.010	0.010
22:05	265	1325		5.809	0.009	0.983	0.008	0.0014	0.9681576	0.010	0.009
22:10	266	1330	22.2	5.817	0.009	0.983	0.008	0.0014	0.9695764	0.010	0.009
22:15	267	1335		5.826	0.008	0.983	0.008	0.0014	0.970992	0.009	0.009
22:20	268	1340	22.3	5.834	0.008	0.983	0.008	0.0014	0.9724043	0.009	0.009
22:25	269	1345		5.843	0.008	0.983	0.008	0.0014	0.9738135	0.009	0.009
22:30	270	1350	22.5	5.851	0.008	0.983	0.008	0.0014	0.9752194	0.009	0.009
22:35	271	1355		5.860	0.008	0.983	0.008	0.0014	0.9766221	0.009	0.009
22:40	272	1360	22.7	5.868	0.008	0.983	0.008	0.0014	0.9780217	0.009	0.009
22:45	273	1365		5.877	0.008	0.983	0.008	0.0014	0.9794182	0.009	0.009
22:50	274	1370	22.8	5.885	0.008	0.983	0.008	0.0014	0.9808115	0.009	0.009
22:55	275	1375		5.893	0.008	0.983	0.008	0.0014	0.9822017	0.009	0.009
23:00	276	1380	23.0	5.902	0.008	0.983	0.008	0.0014	0.9835888	0.009	0.009
23:05	277	1385		5.910	0.008	0.983	0.008	0.0014	0.9849729	0.009	0.009
23:10	278	1390	23.2	5.918	0.008	0.983	0.008	0.0014	0.9863539	0.009	0.009
23:15	279	1395		5.926	0.008	0.983	0.008	0.0014	0.9877319	0.009	0.009
23:20	280	1400	23.3	5.935	0.008	0.983	0.008	0.0014	0.9891068	0.009	0.008
23:25	281	1405		5.943	0.008	0.983	0.008	0.0014	0.9904788	0.009	0.008
23:30	282	1410	23.5	5.951	0.008	0.983	0.008	0.0014	0.9918478	0.008	0.008
23:35	283	1415		5.959	0.008	0.983	0.008	0.0014	0.9932138	0.008	0.008
23:40	284	1420	23.7	5.967	0.008	0.983	0.008	0.0014	0.9945769	0.008	0.008
23:45	285	1425		5.976	0.008	0.983	0.008	0.0014	0.995937	0.008	0.008
23:50	286	1430	23.8	5.984	0.008	0.983	0.008	0.0014	0.9972942	0.008	0.008
23:55	287	1435		5.992	0.008	0.983	0.008	0.0014	0.9986486	0.008	0.008
	288	1440	24.0	6.000	0.008	0.983	0.008	0.0014	1.00	0.008	0.008
									Total Precip:	6.00	5.69


San Diego 24-hr Nested Storm: Horse Ranch Creek
Intensity (in/hr)
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
45
90
135
180
225
270
315
360
405
450
495
540
585
630
675
720
765
810
855
900
945
990
1035
1080
1125
1170
1215
1260
1305
1350
1395
Time (min)

Project: HorseRanchCreek Simulation Run: Exist Q100

Start of Run: 01Jan2009, 00:00 Basin Model: Exist
End of Run: 02Jan2009, 02:00 Meteorologic Model: SD Nested 5 min
Compute Time: 30Jul2009, 13:12:22 Control Specifications: Exist 24 hour

Volume Units: AC-FT

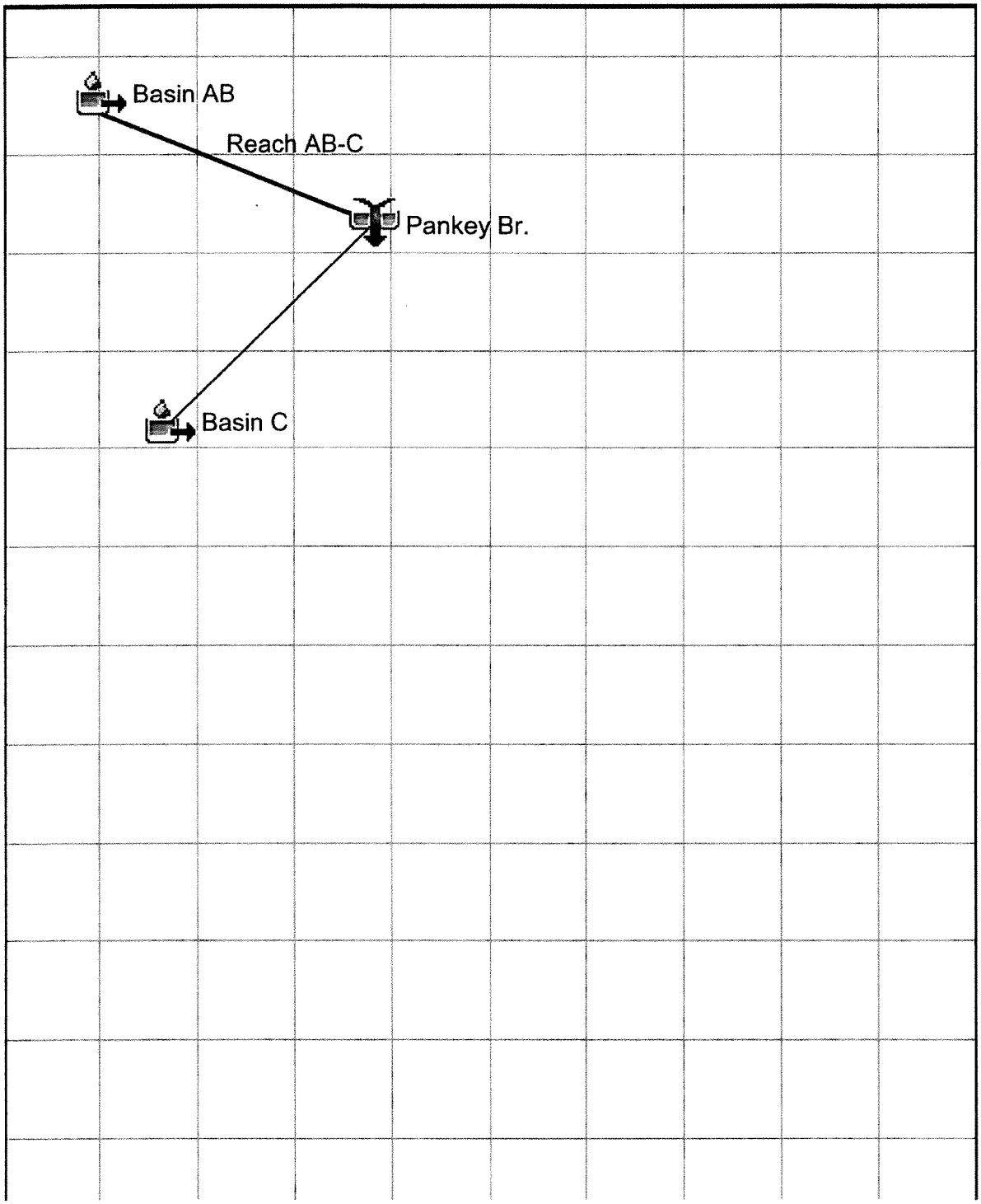
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin AB	9.146	8111.0	01Jan2009, 16:45	2140.0
Basin C	2.329	3224.5	01Jan2009, 16:20	517.0
Pankey Br.	11.475	8801.9	01Jan2009, 17:05	2652.4
Reach AB-C	9.146	8058.1	01Jan2009, 17:10	2135.4

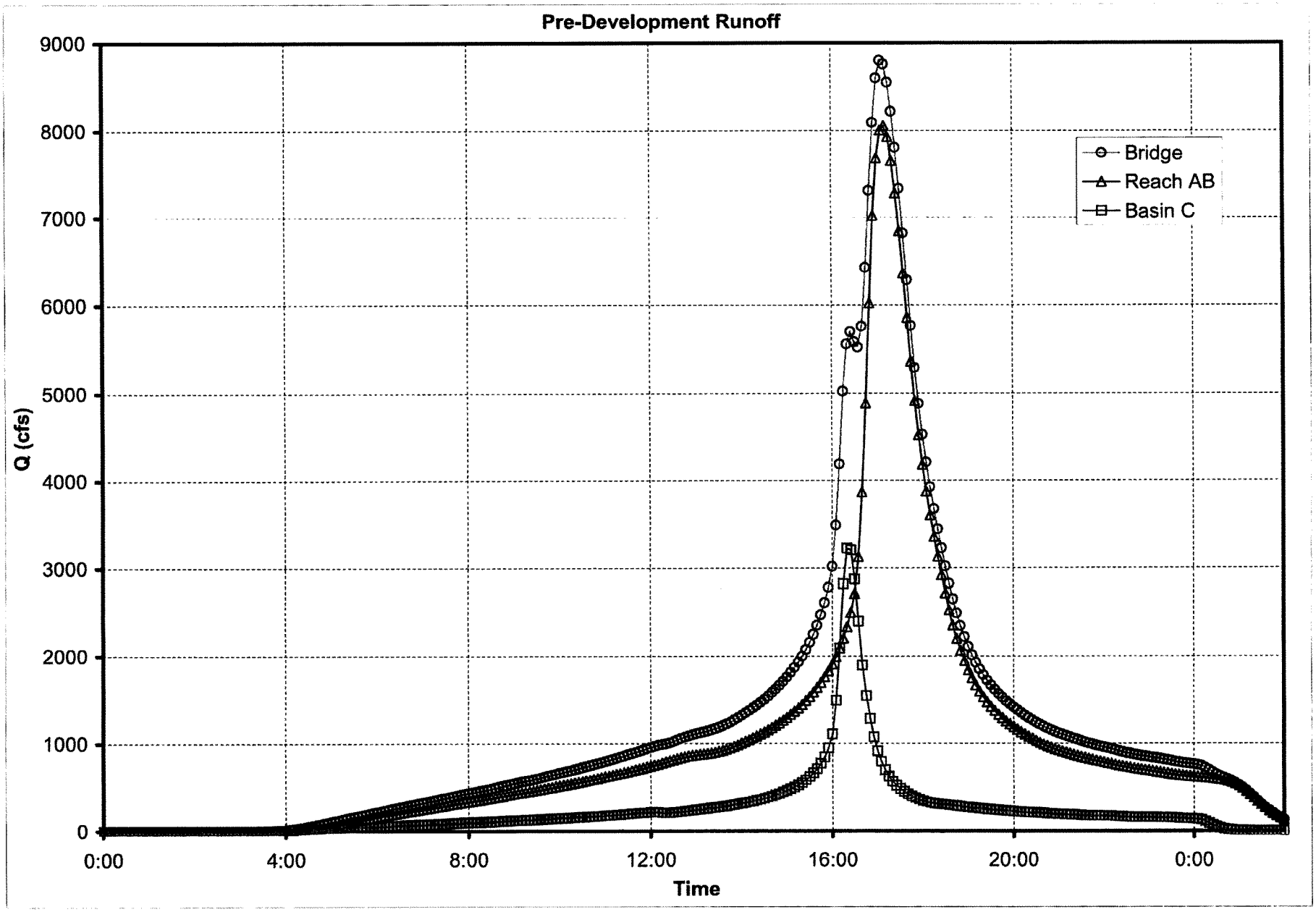
HEC-HMS

Project : HorseRanchCreek

Basin Model : Exist

Jul 30 13:16:20 PDT 2009



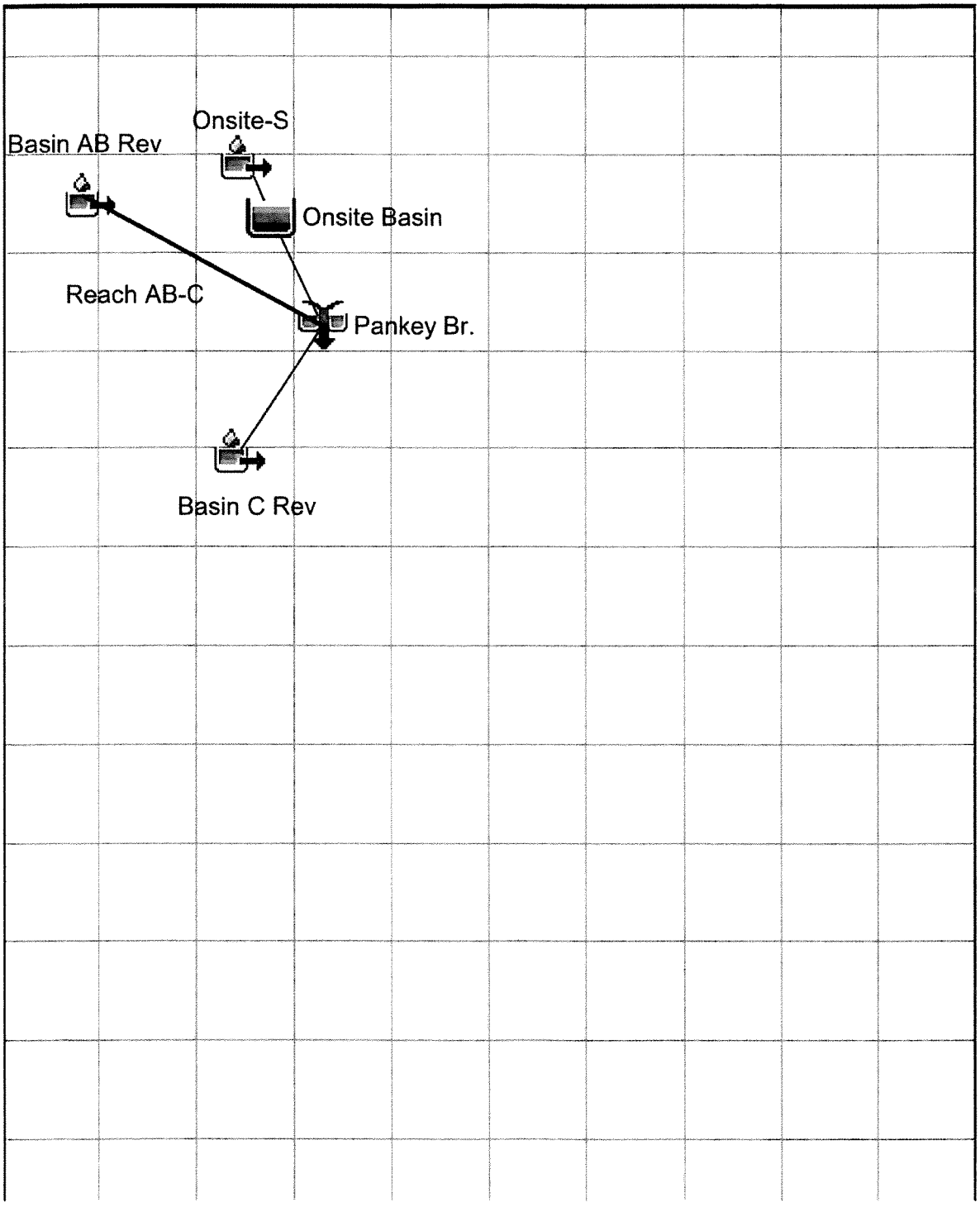

Pre-Development Runoff
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Q (cfs)
0:00
4:00
8:00
12:00
16:00
20:00
0:00
Time
Bridge
Reach AB
Basin C

HEC-HMS

Project : HorseRanchCreek

Basin Model : Developed

Aug 05 15:02:25 PDT 2009



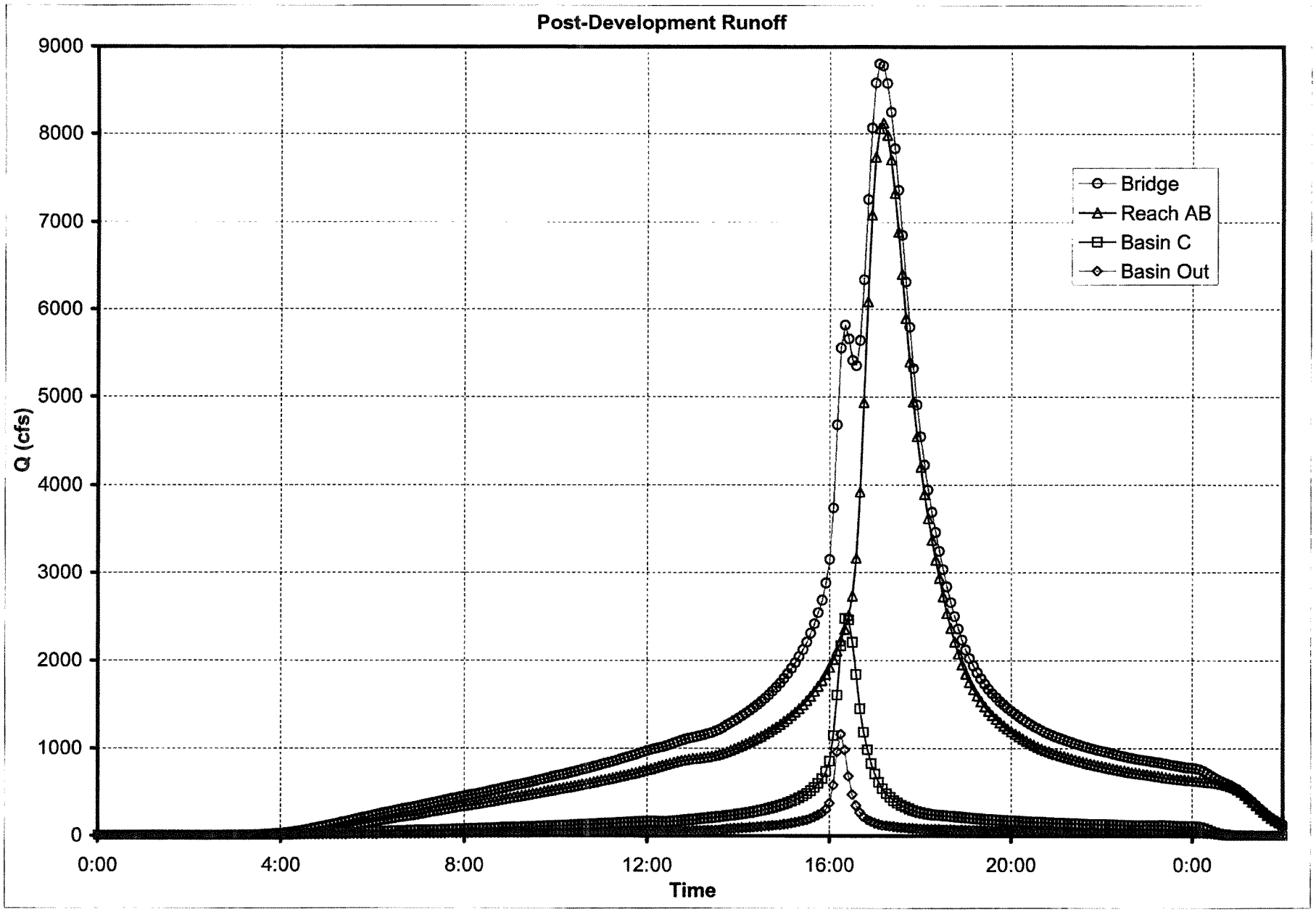
Project: HorseRanchCreek Simulation Run: Proposed Q100

Start of Run: 01Jan2009, 00:00
End of Run: 02Jan2009, 02:00
Compute Time: 05Aug2009, 15:38:03

Basin Model: Developed
Meteorologic Model: SD Nested 5 min
Control Specifications: Prop 24 hour

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin AB Rev	9.199	8168.4	01Jan2009, 16:45	2156.5
Basin C Rev	1.777	2478.4	01Jan2009, 16:20	399.2
Onsite Basin	0.563	1163.1	01Jan2009, 16:15	125.5
Onsite-S	0.563	1181.1	01Jan2009, 16:10	135.5
Pankey Br.	11.539	8799.8	01Jan2009, 17:05	2676.6
Reach AB-C	9.199	8121.3	01Jan2009, 17:10	2151.9


Post-Development Runoff
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Q (cfs)
0:00
4:00
8:00
12:00
16:00
20:00
0:00
Time
Bridge
Reach AB
Basin C
Basin Out

Project: HorseRanchCreek

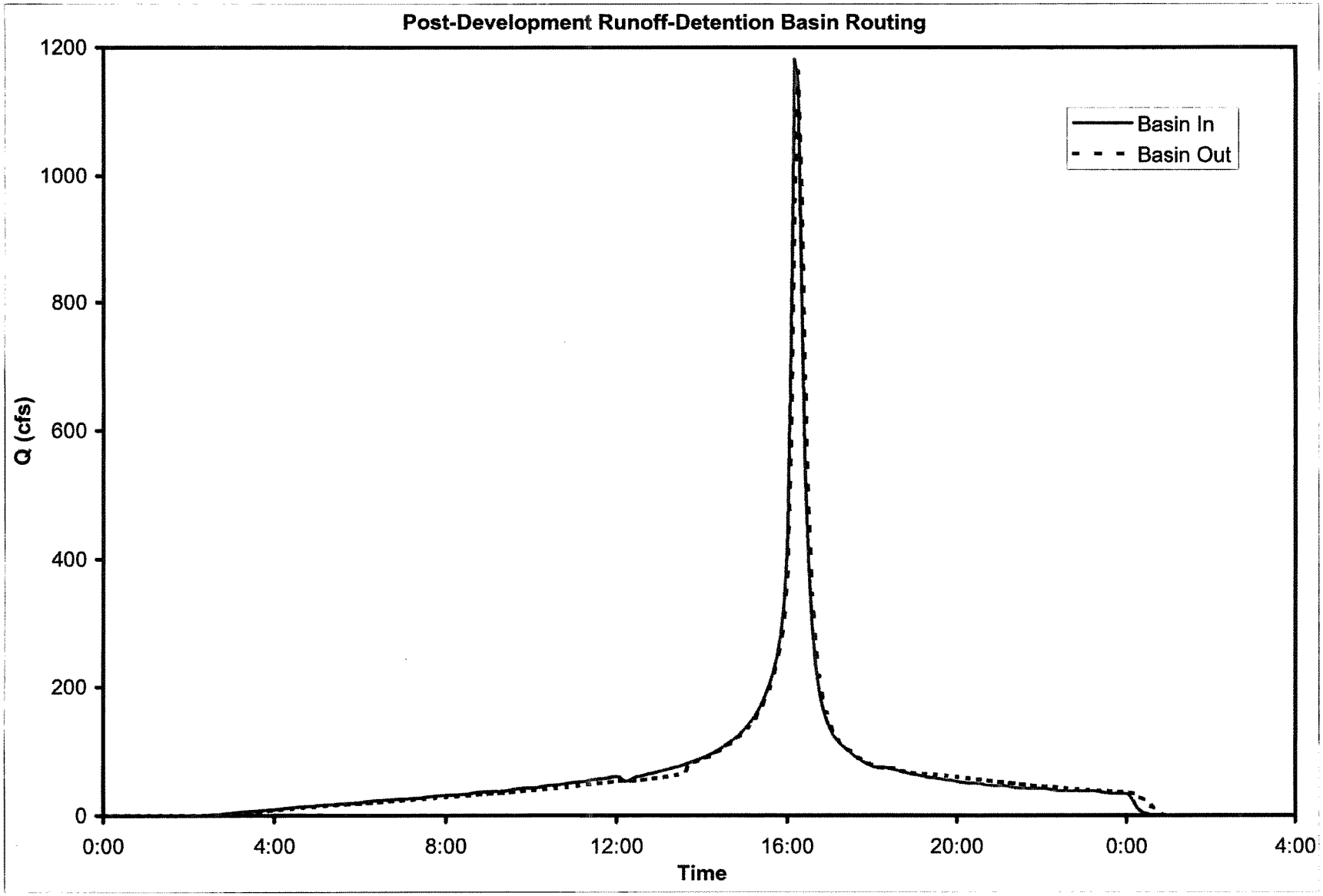
Simulation Run: Proposed Q100 Reservoir: Onsite Basin

Start of Run:	01Jan2009, 00:00	Basin Model:	Developed
End of Run:	02Jan2009, 02:00	Meteorologic Model:	SD Nested 5 min
Compute Time:	05Aug2009, 15:38:03	Control Specifications:	Prop 24 hour

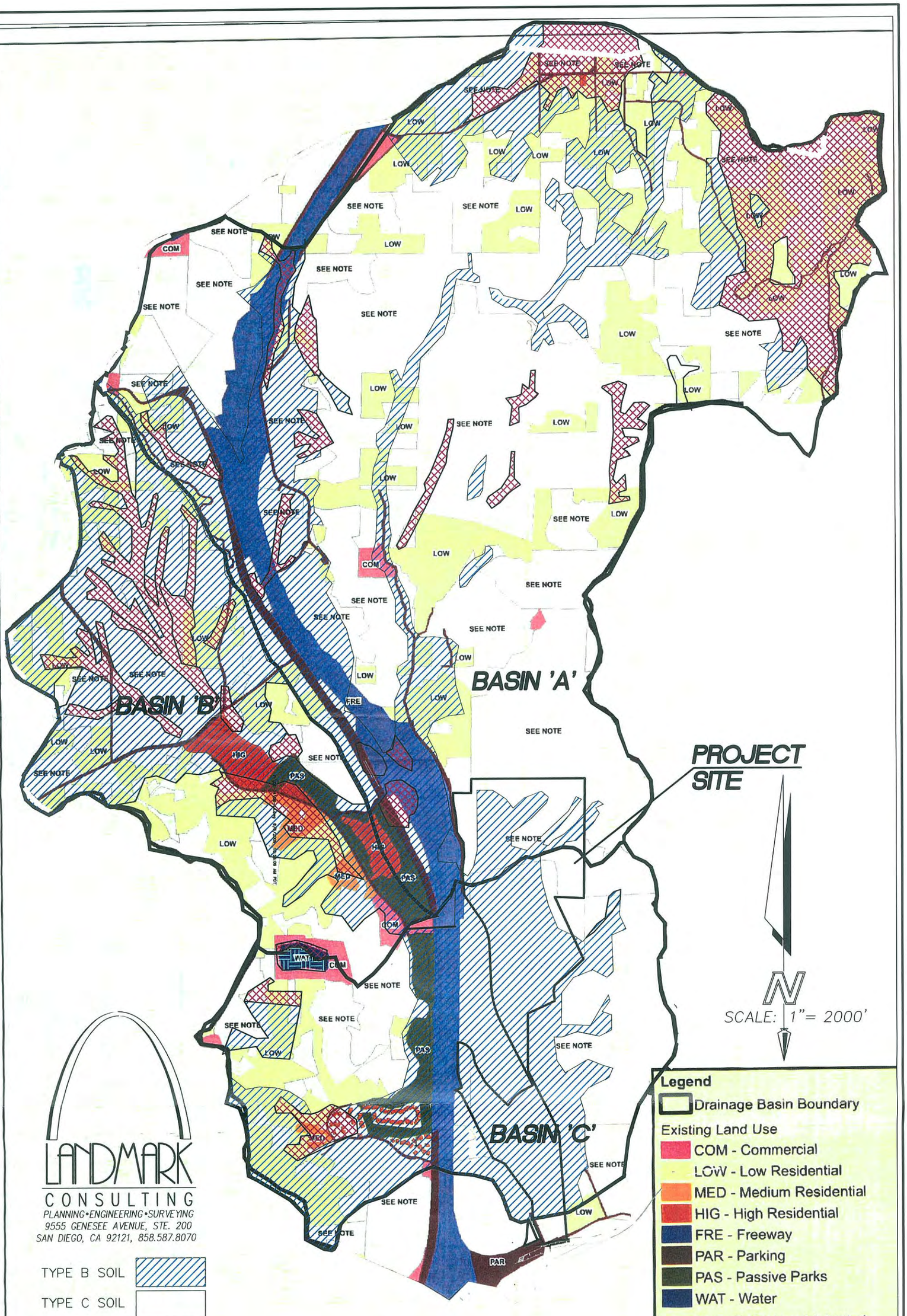
Volume Units: AC-FT

Computed Results

Peak Inflow :	1181.1 (CFS)	Date/Time of Peak Inflow :	01Jan2009, 16:10
Peak Outflow :	1163.1 (CFS)	Date/Time of Peak Outflow :	01Jan2009, 16:15
Total Inflow :	135.5 (AC-FT)	Peak Storage :	10.7 (AC-FT)
Total Outflow :	125.5 (AC-FT)	Peak Elevation :	273.3 (FT)


Post-Development Runoff-Detention Basin Routing
1200
1000
800
600
400
200
0
Q (cfs)
0:00
4:00
8:00
12:00
16:00
20:00
0:00
4:00
Time
Basin In
Basin Out

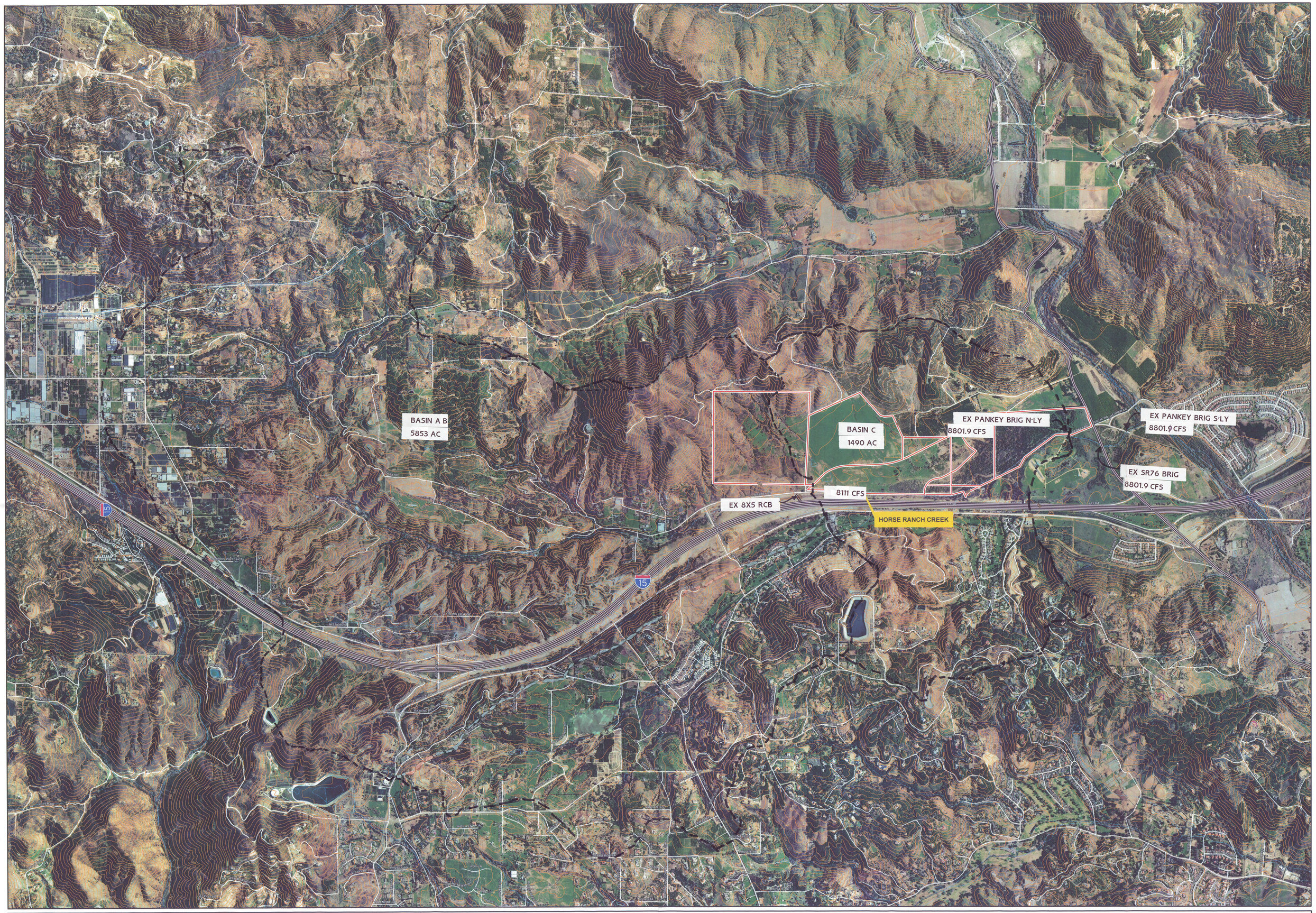
SECTION 8 B:
PRE-DEVELOPMENT CONDITIONS
HORSE RANCH CREEK HEC HMS
HYDROLOGY/DEVELOPMENT TYPE MAP



LANDMARK
CONSULTING
PLANNING•ENGINEERING•SURVEYING
9555 GENESEE AVENUE, STE. 200
SAN DIEGO, CA 92121, 858.587.8070

CAMPUS PARK
SOIL GROUP AND LANDUSE MAP
PRE-DEVELOPMENT

IN·



DPW GIS
Department of Public Works
Geographic Information Services
SanGIS

County of San Diego
Department of Public Works
Geographic Information Services

Site
Roads
Streams
40 Foot Contours

Horse Ranch Creek
HEC HMS HYDROLOGY MAP
PRE-DEVELOPMENT CONDITIONS

1 inch equals 800 feet

Aerial images and parcel line information are not fully registered.

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.

This product may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

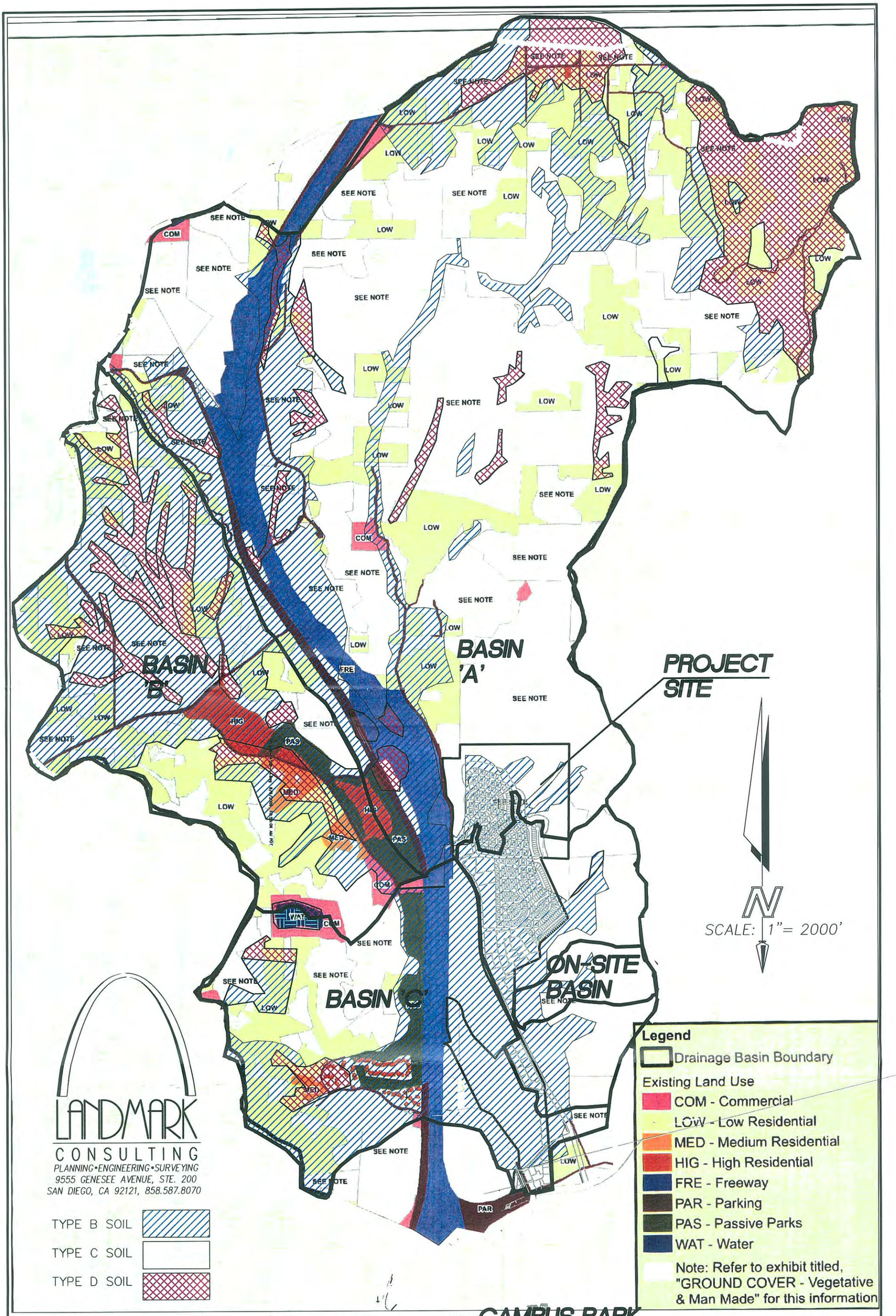
This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

EAGLE AERIAL
Copyright Eagle Aerial All Rights Reserved

'Photography' January 2008
For more information (858) 495-5775

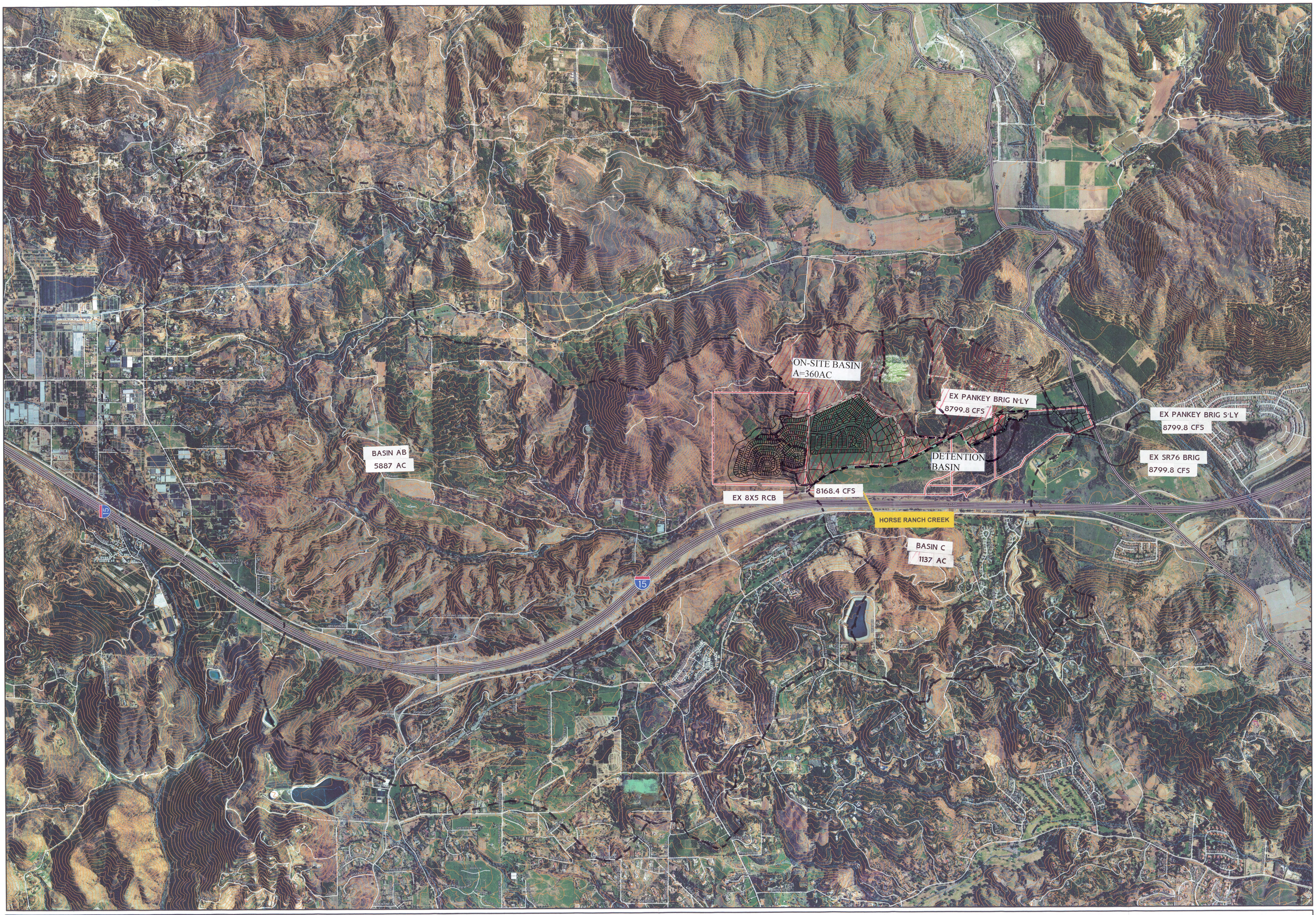
This map (DPW34207-O:\01 Customers_Steve\A-L\Jill Harris\Horse Ranch Creek.mxd) was produced on 7/23/2008

SECTION 8C:
POST-DEVELOPMENT CONDITIONS
HORSE RANCH CREEK HEC HMS
HYDROLOGY/DEVELOPMENT TYPE MAP



LANDMARK
CONSULTING
PLANNING•ENGINEERING•SURVEYING
9555 GENESEE AVENUE, STE. 200
SAN DIEGO, CA 92121, 858.587.8070

CAMPUS PARK
SOIL GROUP AND LANDUSE MAP
POST-DEVELOPMENT



DPW GIS
Department of Public Works
Geographic Information Services
SanGIS

County of San Diego
Department of Public Works
Geographic Information Services

Site
Roads
Streams
40 Foot Contours

AREA ROUTED THROUGH DETENTION BASIN
MODELED AS ON-SITE BASIN IN HEC-HMS ANALYSIS
(360 Ac)

Horse Ranch Creek
HEC HMS HYDROLOGY MAP
POST-DEVELOPMENT CONDITIONS

1 inch equals 800 feet

Aerial images and parcel line information are not fully registered.

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.

This product may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

EAGLE AERIAL IMAGING
Copyright Eagle Aerial All Rights Reserved

Photography: January 2006
For more information (858) 495-5775

This map (DPW34207-O:\01 Customers_Steve\A-L\Jill Harris\Horse Ranch Creek.mxd) was produced on 7/23/2006

SECTION 8D:

Cn NUMBER CALCULATIONS

Project Campus Park **Date** 07/29/09

Subject Curve Number Calculations (PZN 2.0)

Soil Break Down(PREDEV)

Subarea	B	C	D	Total
A	792	3183	576	4551.0
B	745	312	237	1294.3
C	873.0	570	48.0	1491.1
Totals	2410	4065	861	7336
	33%	55%	12%	

Soil Break Down(POST DEV.)

Subarea	B	C	D	Total
A	834	3183	576	4592.7
B	745	312	237	1294.6
C	853.6	562	48.0	1463.5
Totals	2433	4057	861	7351
	33%	55%	12%	

Pre-Development Subareas

		Group B		Group C		Group D			
Basin	Landuse	Area (ac)	CN	Area (ac)	CN	Area (ac)	CN	Area (ac)	CN x A
AB	Low Density Res.	236	65	68	77	212	82	516	37941
	Med Density Res.	0	72	0	81	18	86	18	1548
	High Density Res.	52	85	0	90	9	92	61	5276
	Commercial	0	92	0	94	2	95	2	152
	Passive Park	71	61	0	74	0	80	71	4355
	Broadleaf Chapparal	0	63	0	75	0	81	0	0
	Narrowleaf Chapparal	651	72	3052	81	536	86	4239	340180
	Evegreen Orchards	364	65	301	77	10	82	675	47622
	Paved Roads	172	98	74	98	26	98	272	26636
	Totals	1546		3495		813		5853	463710
								Composite CN =	79.2

		Group B		Group C		Group D			
Basin	Landuse	Area (ac)	CN	Area (ac)	CN	Area (ac)	CN	Total Area (ac)	CN x A
C	Low Density Res.	95	65	68	77	22	82	185	13215
	Med Density Res.	1	72	0	81	6	86	7	594
	High Density Res.	22	85	0	90	13	92	35	3066
	Commercial	2	92	14	94	0	95	16	1519
	Passive Park	71	61	0	74	0	80	71	4355
	Broadleaf Chapparal	0	63	0	75	0	81	0	0
	Narrowleaf Chapparal	509	72	349	81	7	86	865	65519
	Evegreen Orchards	89	65	111	77	0	82	200	14306
	Paved Roads	83	98	28	98	0	98	111	10878
		872		570		48		1490	113452
								Composite CN =	76.1

Total Area for Pre-Dev:	2418	4065	861	7344
Post-Development Subareas	33%	55%	12%	

Basin AB

		Group B		Group C		Group D			
	Landuse	Area (ac)	CN	Area (ac)	CN	Area (ac)	CN	Total Area (ac)	CN x A
	Low Density Res.	236	65	68	77	212	82	516	37960
	Med Density Res.	0	72	0	81	18	86	18	1548
	High Density Res.	89	85	10	90	9	92	108	9311
	Commercial	0	92	0	94	16	95	16	1520
	Passive Park	74	61	0	74	0	80	74	4514
	Broadleaf Chapparal	0	63	0	75	0	81	0	0
	Narrowleaf Chapparal	616	72	3056	81	536	86	4208	337984
	Evegreen Orchards	364	65	301	77	10	82	675	47657
	Paved Roads	184	98	74	98	14	98	272	26656
	Totals	1563		3509		815		5887	467150
								Composite CN =	79.4

Basin C

		Group B		Group C		Group D			
	Landuse	Area (ac)	CN	Area (ac)	CN	Area (ac)	CN	Total Area (ac)	CN x A
	Low Density Res.	95	65	68	77	22	82	185	13215
	Med Density Res.	1	72	2	81	6	86	9	750
	High Density Res.	36	85	14	90	23	92	73	6454
	Commercial	2	92	0	94	0	95	2	184
	Passive Park	71	61	0	74	0	80	71	4331
	Broadleaf Chapparal	0	63	0	75	0	81	0	0
	Narrowleaf Chapparal	352	72	300	81	7	86	659	50246
	Evegreen Orchards	21	65	7	77	0	82	28	1904
Basin	Paved Roads	83	98	28	98	0	98	111	10878
Onsite		661		419		58		1138	87962
								Composite CN =	77.3

		Group B		Group C		Group D			
	Landuse	Area (ac)	CN	Area (ac)	CN	Area (ac)	CN	Total Area (ac)	CN x A
	High Density Res.	9	85	63	90	0	92	72	6435
	Commercial	10	92	10	94	0	95	20	1860
	Broadleaf Chapparal	0	63	0	75	0	81	0	0
	Narrowleaf Chapparal	140	72	107	81	0	86	247	18707
	Evegreen Orchards	0	65	0	77	0	82	0	0
	Paved Roads	5	98	17	98	0	98	22	2156
		164		197		0		361	29158
								Composite CN =	80.9

Total Area for Post-Dev:	2388	4125	873	7386
	33%	56%	12%	

SECTION 9:
100-YEAR HYDRAULIC ANALYSIS

A HEC-RAS analysis of the Horse Ranch Creek floodplain was prepared to demonstrate that the proposed project can be developed without detrimental effects to the flood carrying capacity of Horse Ranch Creek or to the surrounding properties and that the proposed pad elevations at the lower reaches of the floodplain are high enough that the building pads will not be inundated by flood waters. The HEC-RAS analysis calculated the floodplain limits of the Horse Ranch Creek (at critical locations) from the existing Pankey Road bridge southerly of SR-76 to the northerly limits of Horse Ranch Creek within the project boundary (in the pre-development, post-development and capacity conditions). The flow velocities and water surface elevations are listed in the following pages. As mentioned above, it was assumed the surrounding developments would reduce their post-development runoff volumes to pre-development levels. For the post-development condition, it was assumed only TM 5338 was built. Following the calculations are the pre-development, post-development and capacity floodplain limit exhibits.

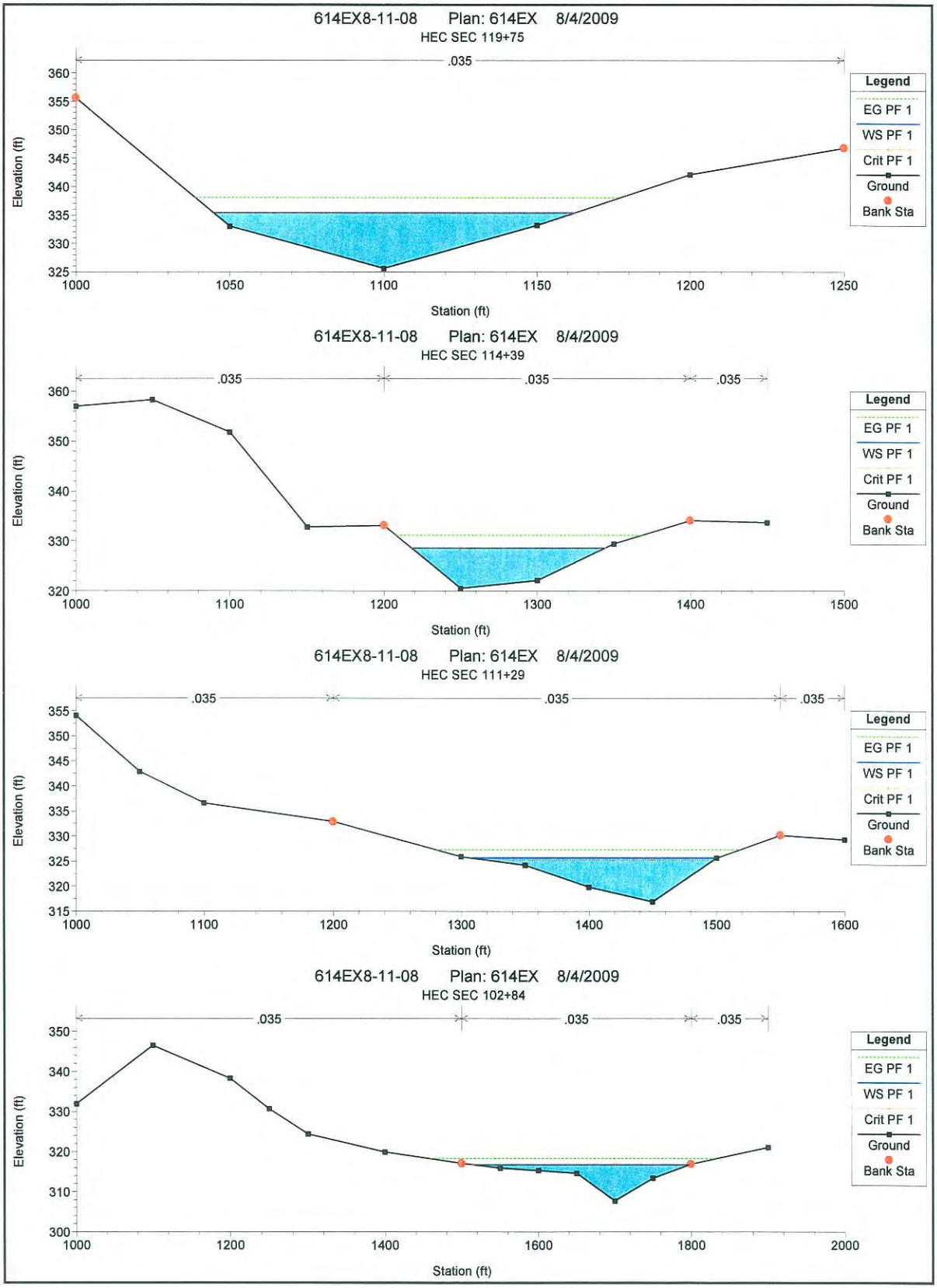
The runoff volumes used in the HEC-RAS program, for the pre and post-development 100-year flows, were taken from Section 8 - Horse Ranch Creek 100-year NRCS Hydrologic Method.

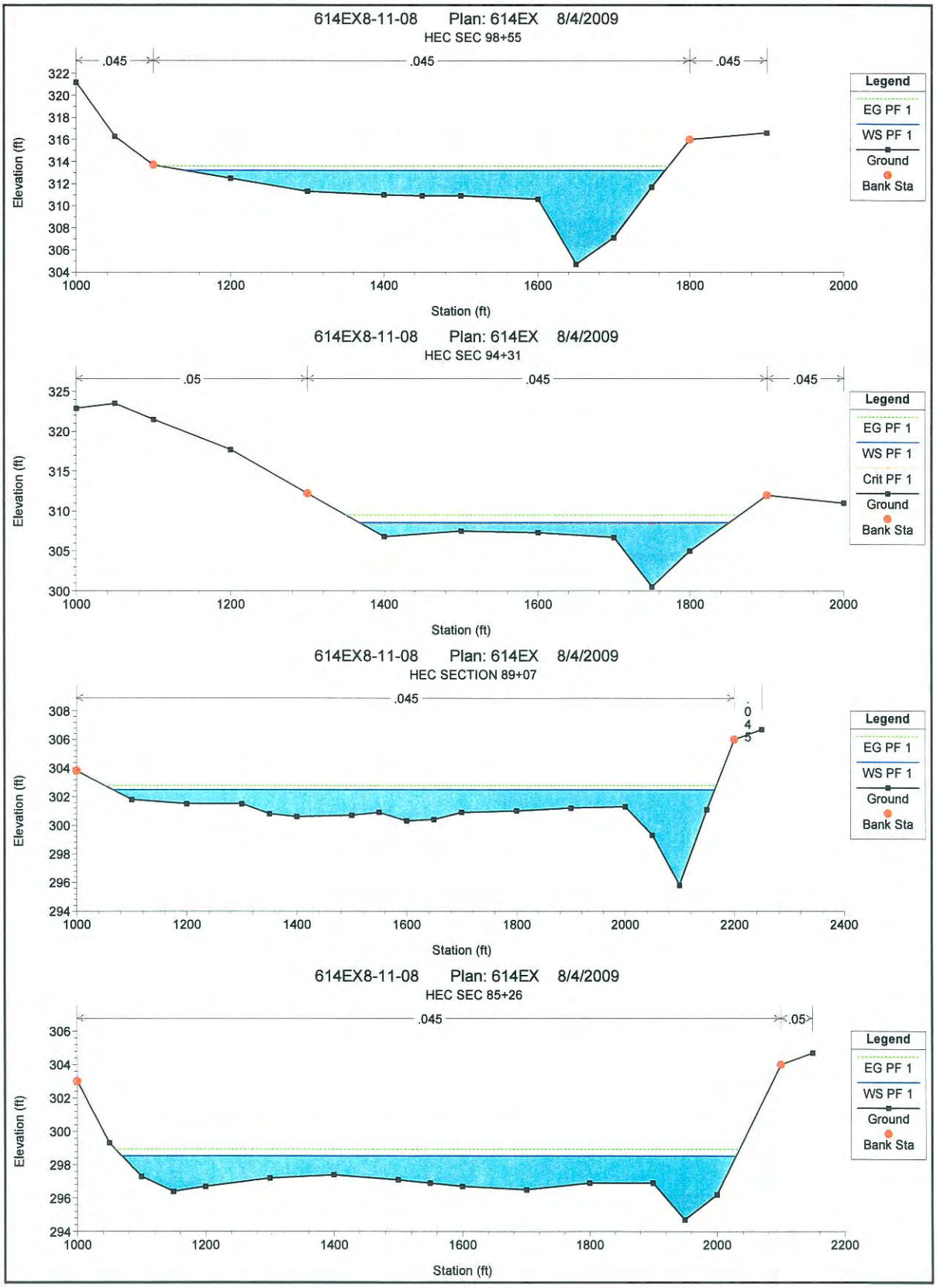
At the end of this section, the capacity of the existing 5'x8' box culvert under Pankey Road (north) during post-development conditions to verify that the proposed project does not adversely impact this culvert crossing under outlet control conditions.

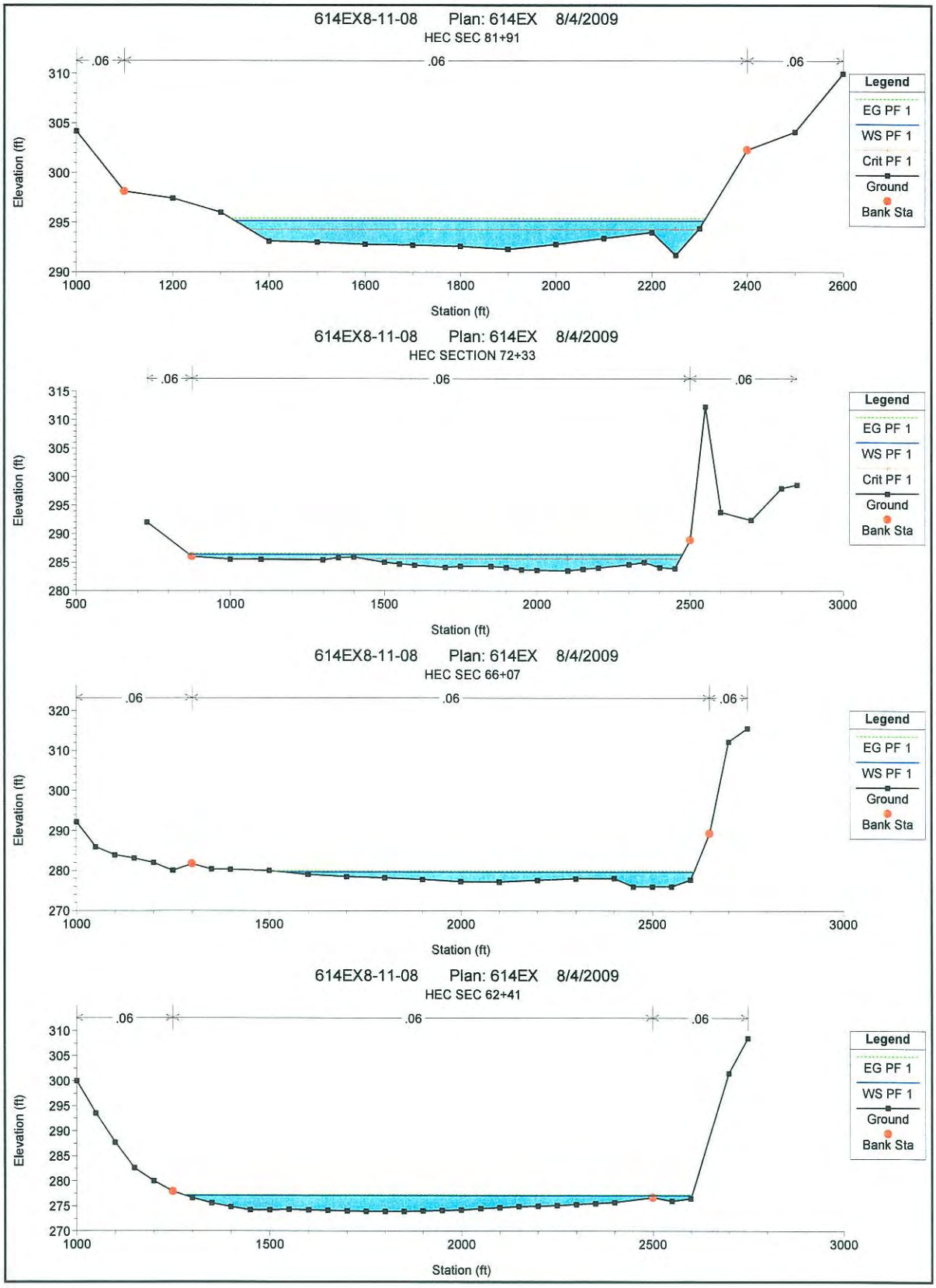
SECTION 9A:
HORSE RANCH CREEK HEC-RAS CALCS
PRE-DEVELOPMENT CONDITIONS

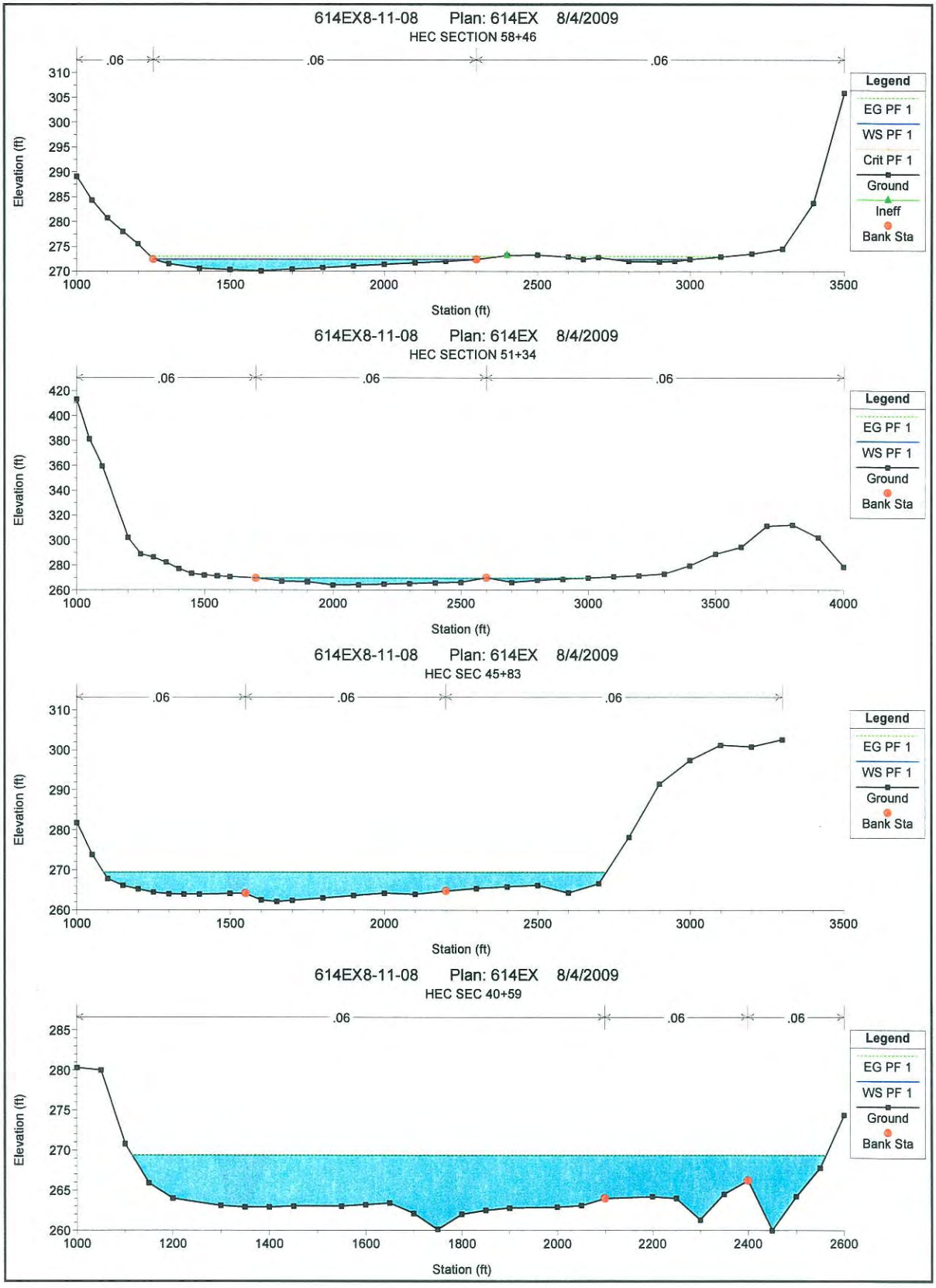
HEC-RAS Plan: 614 PRE DEV River: HRC Reach: 1 Profile: PF 1

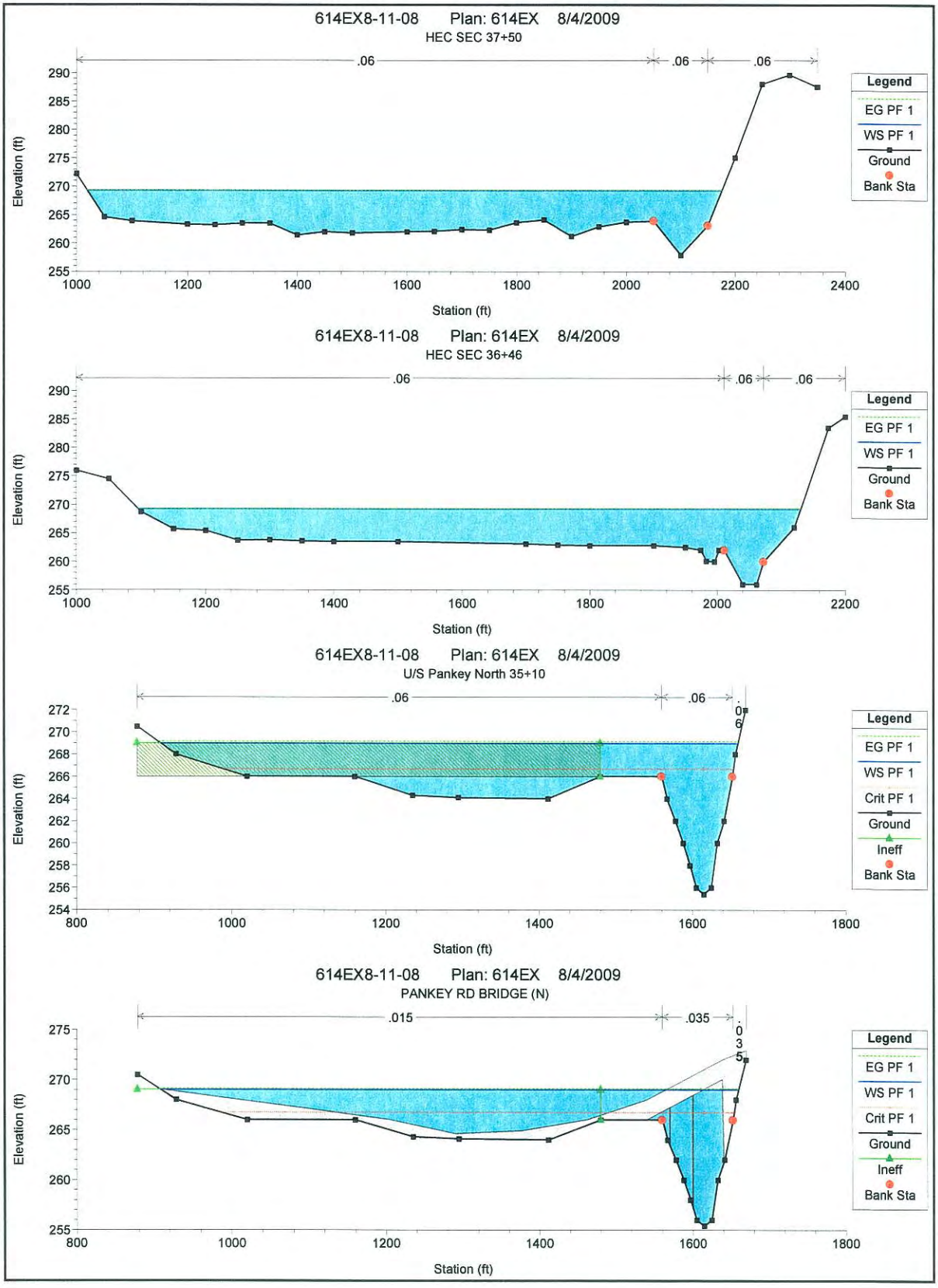
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	11975	PF 1	8111.00	325.60	335.35	335.35	338.02	0.010559	13.09	619.43	117.30	1.00
1	11439	PF 1	8152.00	320.50	328.58	328.58	331.12	0.010662	12.79	637.49	126.46	1.00
1	11129	PF 1	8192.00	316.90	325.62	325.21	327.28	0.009001	10.33	793.10	192.08	0.90
1	10284	PF 1	8233.00	307.70	316.77	316.77	318.27	0.012686	9.81	839.08	284.53	1.01
1	9855	PF 1	8273.00	304.70	313.22		313.59	0.005950	4.92	1683.20	627.25	0.53
1	9431	PF 1	8314.00	300.50	308.58	308.41	309.50	0.018731	7.70	1079.11	484.02	0.91
1	8907	PF 1	8354.00	295.80	302.47		302.78	0.008827	4.44	1881.06	1097.71	0.60
1	8526	PF 1	8395.00	294.70	298.53		298.94	0.011876	5.13	1636.01	960.54	0.69
1	8191	PF 1	8436.00	291.70	295.15	294.29	295.40	0.009478	4.01	2103.47	980.30	0.48
1	7233	PF 1	8476.00	283.50	286.35	285.60	286.51	0.009139	3.27	2595.13	1607.93	0.45
1	6607	PF 1	8517.00	276.00	279.59		279.87	0.012655	4.24	2007.02	1067.33	0.55
1	6241	PF 1	8558.00	273.90	277.07		277.21	0.004647	2.97	2921.63	1320.46	0.34
1	5846	PF 1	8598.00	270.10	272.36	272.33	272.98	0.045662	6.33	1358.45	1279.23	0.98
1	5134	PF 1	8639.00	264.00	269.65		269.74	0.001543	2.36	3934.64	1288.57	0.21
1	4583	PF 1	8679.00	262.10	269.46		269.48	0.000209	1.19	8157.92	1638.54	0.09
1	4059	PF 1	8720.00	261.30	269.36		269.37	0.000150	0.94	8681.03	1447.05	0.07
1	3750	PF 1	8761.00	257.90	269.29		269.31	0.000184	1.40	7464.49	1156.61	0.08
1	3646	PF 1	8801.00	256.00	269.25		269.28	0.000283	2.09	6235.12	1035.54	0.11
1	3510	PF 1	8802.00	255.40	268.99	266.68	269.15	0.001629	0.84	3123.05	751.96	0.05
1	3476		Bridge									
1	3447	PF 1	8802.00	255.30	268.81	266.27	268.97	0.001388	4.27	3234.02	733.12	0.23
1	3050	PF 1	8802.00	252.25	267.75	266.30	268.10	0.004064	5.86	2127.08	1064.95	0.38
1	2846	PF 1	8802.00	252.30	267.14		267.45	0.002393	5.43	2413.18	608.74	0.31
1	2595	PF 1	8802.00	251.40	265.35	260.83	266.35	0.005779	8.04	1094.95	119.39	0.47
1	2525		Bridge									
1	2441	PF 1	8802.00	249.30	264.65		264.88	0.001823	4.83	3158.42	1097.24	0.26
1	2225	PF 1	8802.00	251.30	264.13		264.39	0.002775	5.17	2589.23	964.67	0.32
1	1989	PF 1	8802.00	250.30	262.07		263.07	0.009108	8.25	1222.35	425.39	0.57
1	1665	PF 1	8802.00	246.00	258.97	255.19	260.32	0.007219	9.37	969.70	127.55	0.53
1	1624		Bridge									
1	1580	PF 1	8802.00	246.00	257.61		258.64	0.005961	8.17	1091.89	132.14	0.48
1	1374	PF 1	8802.00	246.00	257.00	252.54	257.50	0.003218	5.94	1806.42	459.67	0.35

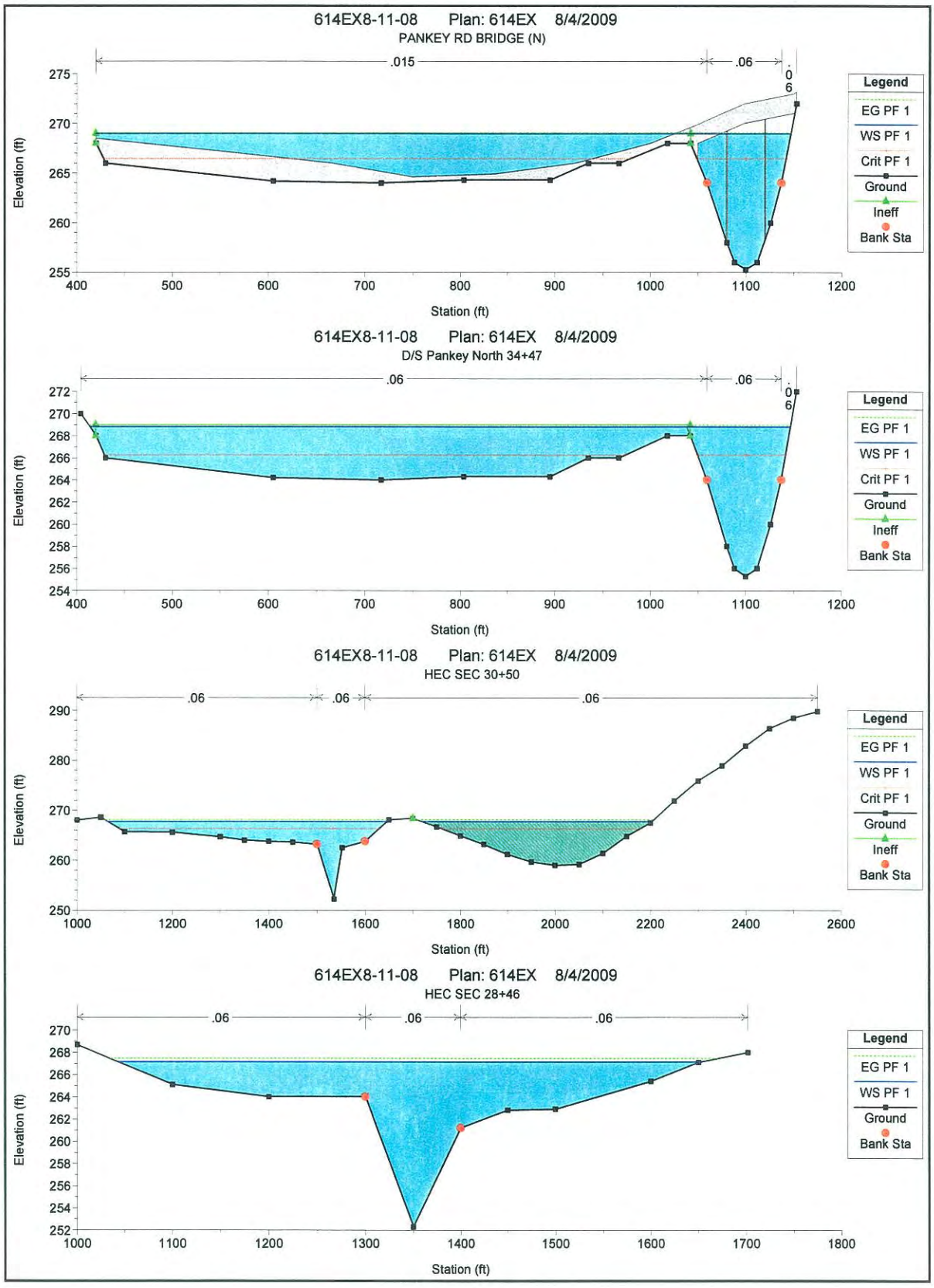

614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 119+75
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 114+39
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 111+29
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 102+84
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

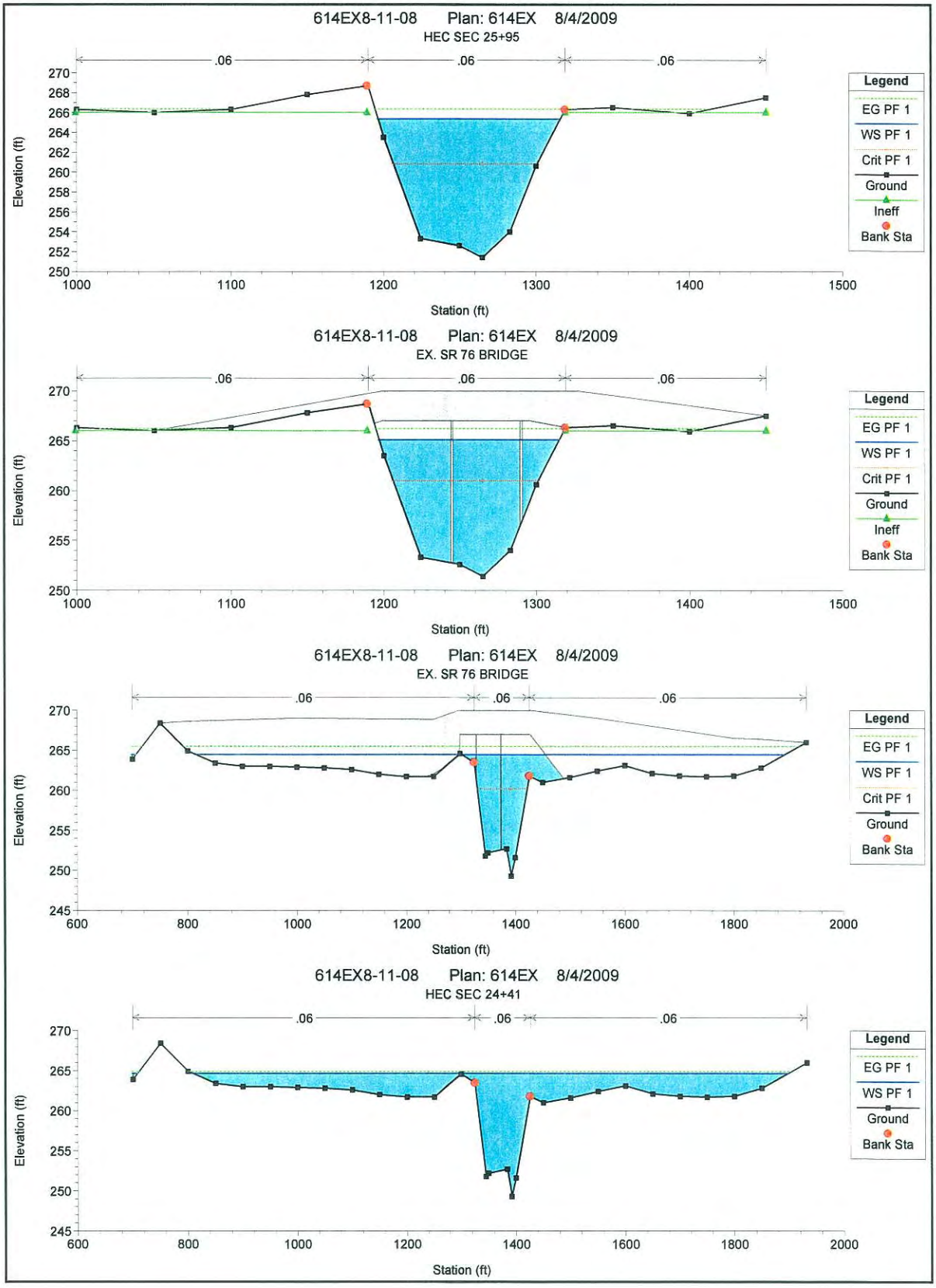

614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 98+55
.045
.045
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 94+31
.05
.045
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SECTION 89+07
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 85+26
.045
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

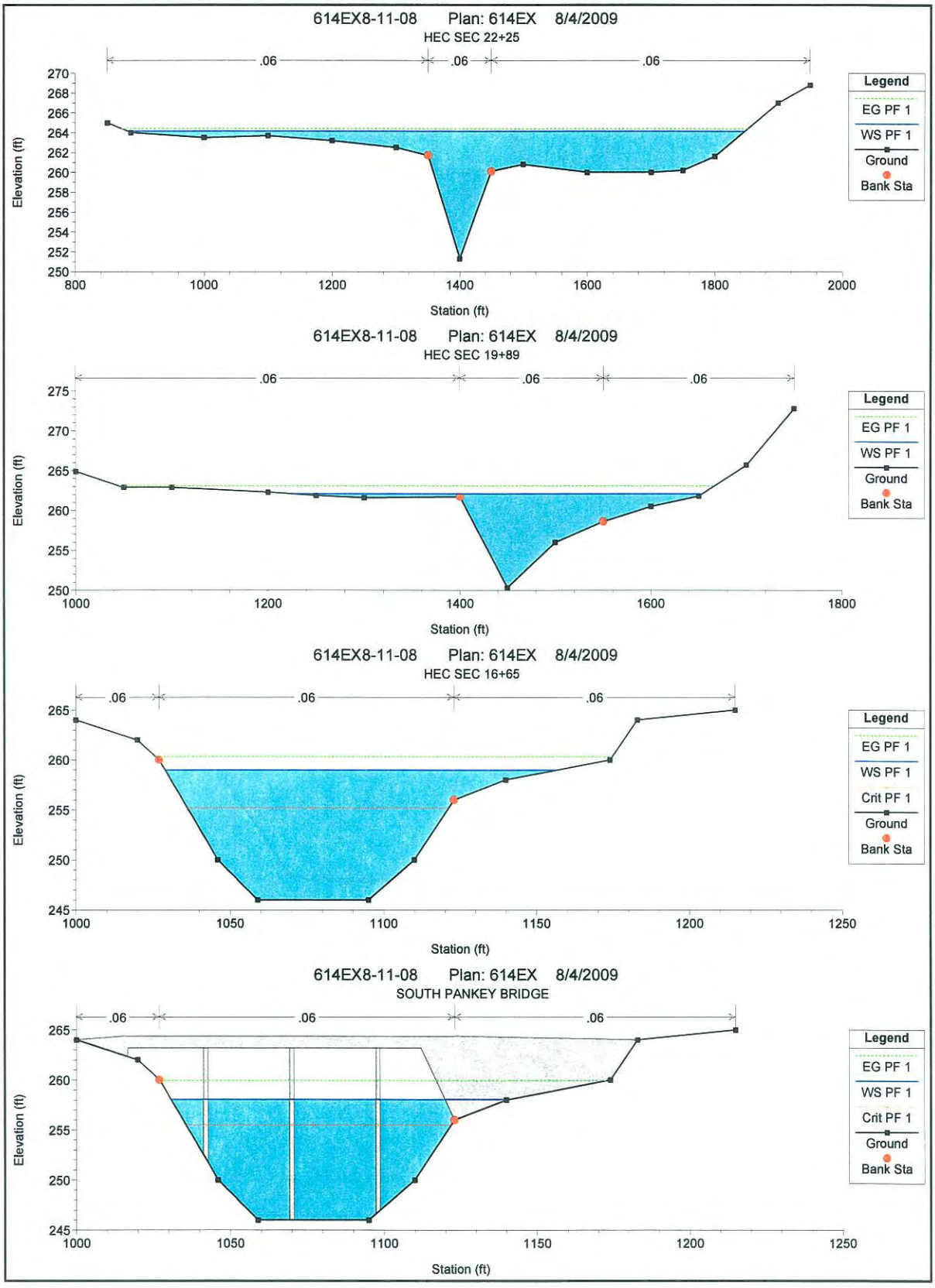

614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 81+91
.06
.06
.06
Elevation (ft)
310
305
300
295
290
1000
1200
1400
1600
1800
2000
2200
2400
2600
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SECTION 72+33
.06
.06
.06
Elevation (ft)
315
310
305
300
295
290
285
280
500
1000
1500
2000
2500
3000
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 66+07
.06
.06
.06
Elevation (ft)
320
310
300
290
280
270
1000
1500
2000
2500
3000
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 62+41
.06
.06
.06
Elevation (ft)
310
305
300
295
290
285
280
275
270
1000
1500
2000
2500
3000
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

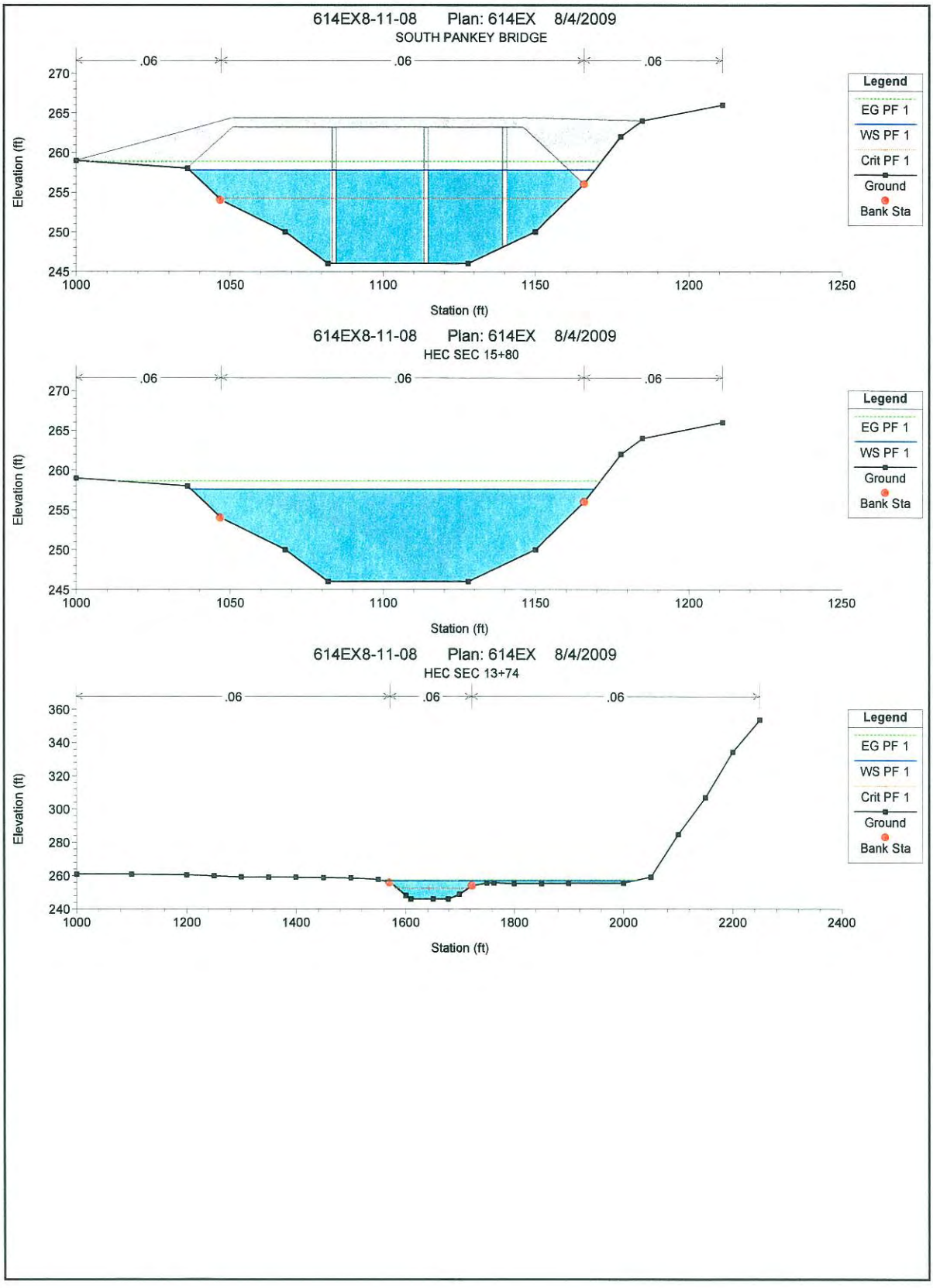

614EX8-11-08 Plan: 614EX 8/4/2009
HEC SECTION 58+46
.06
.06
.06
Elevation (ft)
310
305
300
295
290
285
280
275
270
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SECTION 51+34
.06
.06
.06
Elevation (ft)
420
400
380
360
340
320
300
280
260
1000
1500
2000
2500
3000
3500
4000
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 45+83
.06
.06
.06
Elevation (ft)
310
300
290
280
270
260
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 40+59
.06
.06
.06
Elevation (ft)
285
280
275
270
265
260
1000
1200
1400
1600
1800
2000
2200
2400
2600
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

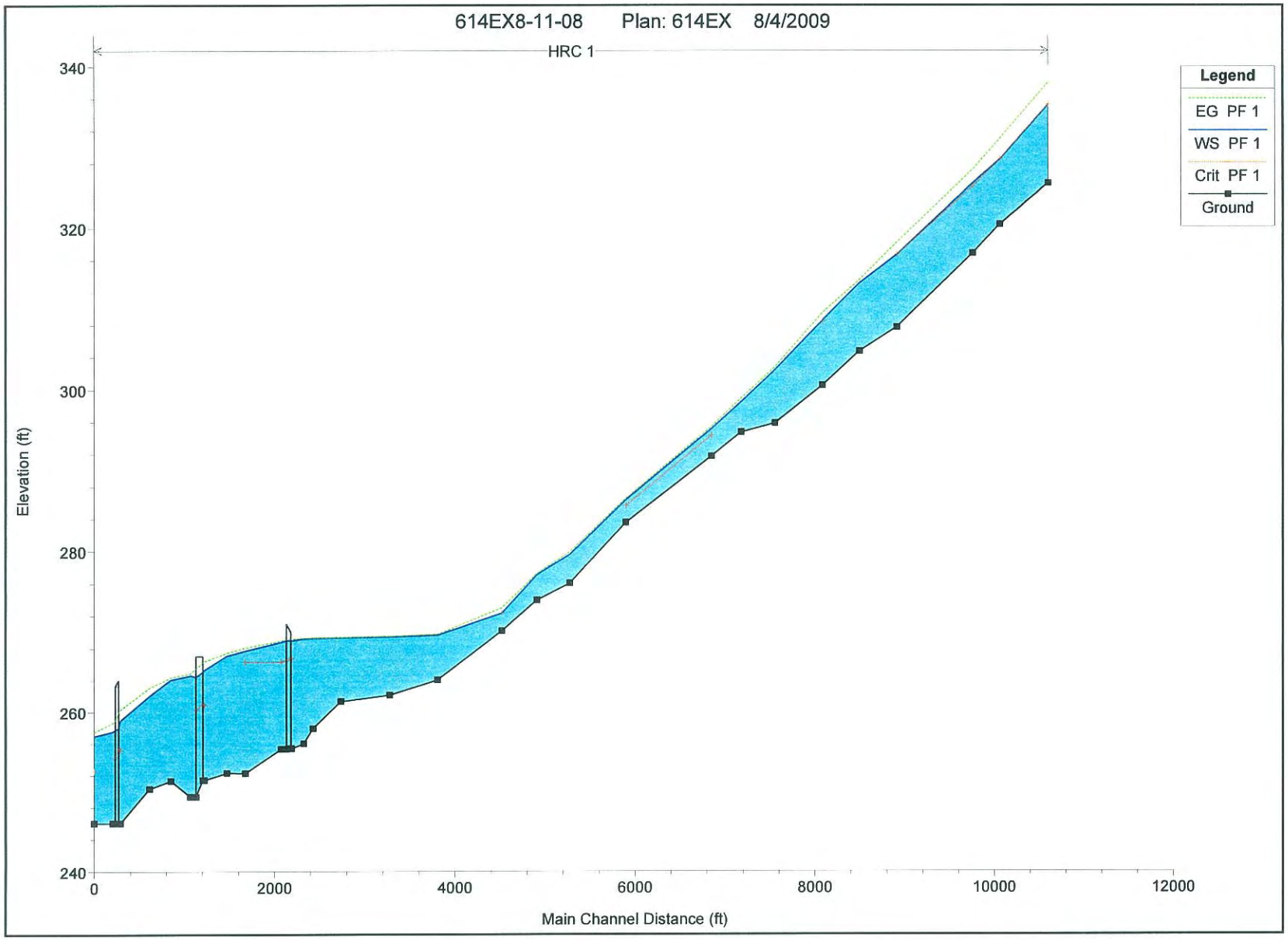

614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 37+50
.06
.06
.06
Elevation (ft)
290
285
280
275
270
265
260
255
1000
1200
1400
1600
1800
2000
2200
2400
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 36+46
.06
.06
.06
Elevation (ft)
290
285
280
275
270
265
260
255
1000
1200
1400
1600
1800
2000
2200
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
U/S Pankey North 35+10
.06
.06
.06
Elevation (ft)
272
270
268
266
264
262
260
258
256
254
800
1000
1200
1400
1600
1800
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
PANKEY RD BRIDGE (N)
.015
.035
.03
5
Elevation (ft)
275
270
265
260
255
800
1000
1200
1400
1600
1800
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


614EX8-11-08 Plan: 614EX 8/4/2009
PANKEY RD BRIDGE (N)
.015
.06
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
D/S Pankey North 34+47
.06
.06
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 30+50
.06
.06
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 28+46
.06
.06
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

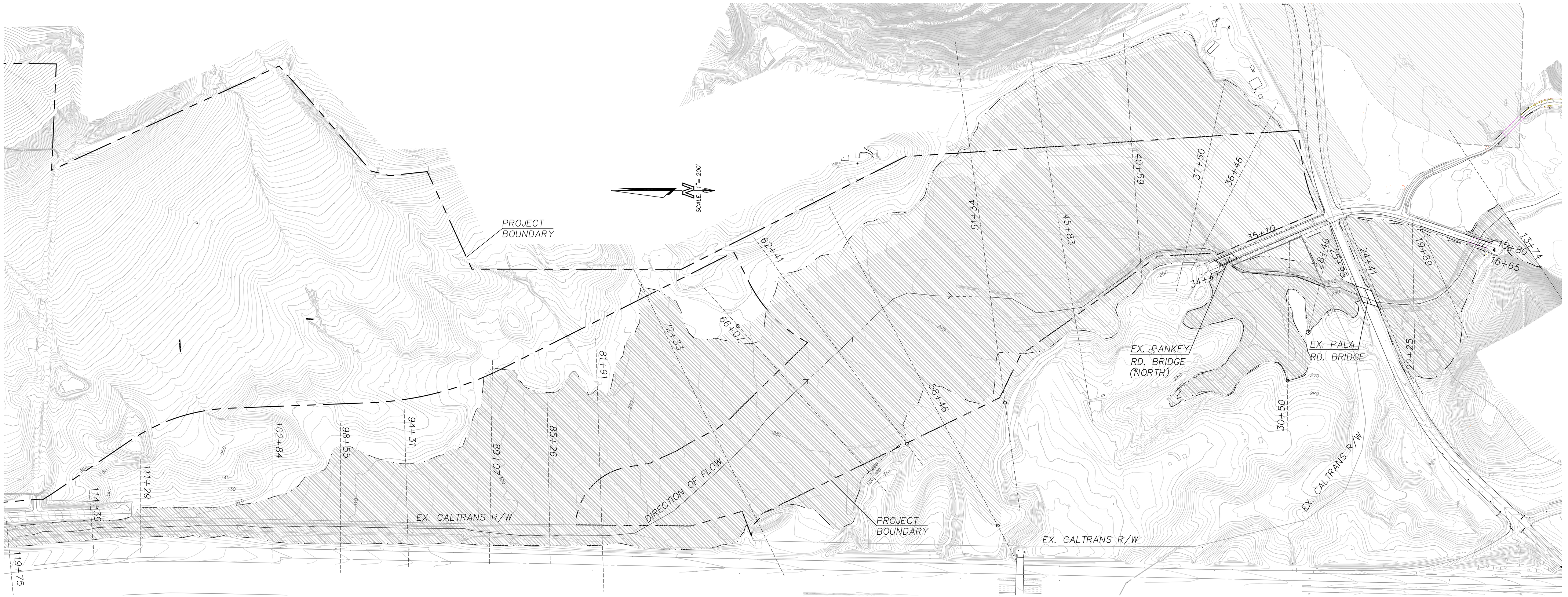

614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 25+95
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
EX. SR 76 BRIDGE
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
EX. SR 76 BRIDGE
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 24+41
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 22+25
.06
.06
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 19+89
.06
.06
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 16+65
.06
.06
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
614EX8-11-08 Plan: 614EX 8/4/2009
SOUTH PANKEY BRIDGE
.06
.06
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


614EX8-11-08 Plan: 614EX 8/4/2009
SOUTH PANKEY BRIDGE
.06
.06
.06
Elevation (ft)
270
265
260
255
250
245
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 15+80
.06
.06
.06
Elevation (ft)
270
265
260
255
250
245
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614EX8-11-08 Plan: 614EX 8/4/2009
HEC SEC 13+74
.06
.06
.06
Elevation (ft)
360
340
320
300
280
260
240
1000
1200
1400
1600
1800
2000
2200
2400
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


614EX8-11-08 Plan: 614EX 8/4/2009
HRC 1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
340
320
300
280
260
240
0
2000
4000
6000
8000
10000
12000
Main Channel Distance (ft)

CAMPUS PARK
HECRAS SECTIONS & FLOOD LIMITS
PRE-DEVELOPMENT CONDITIONS



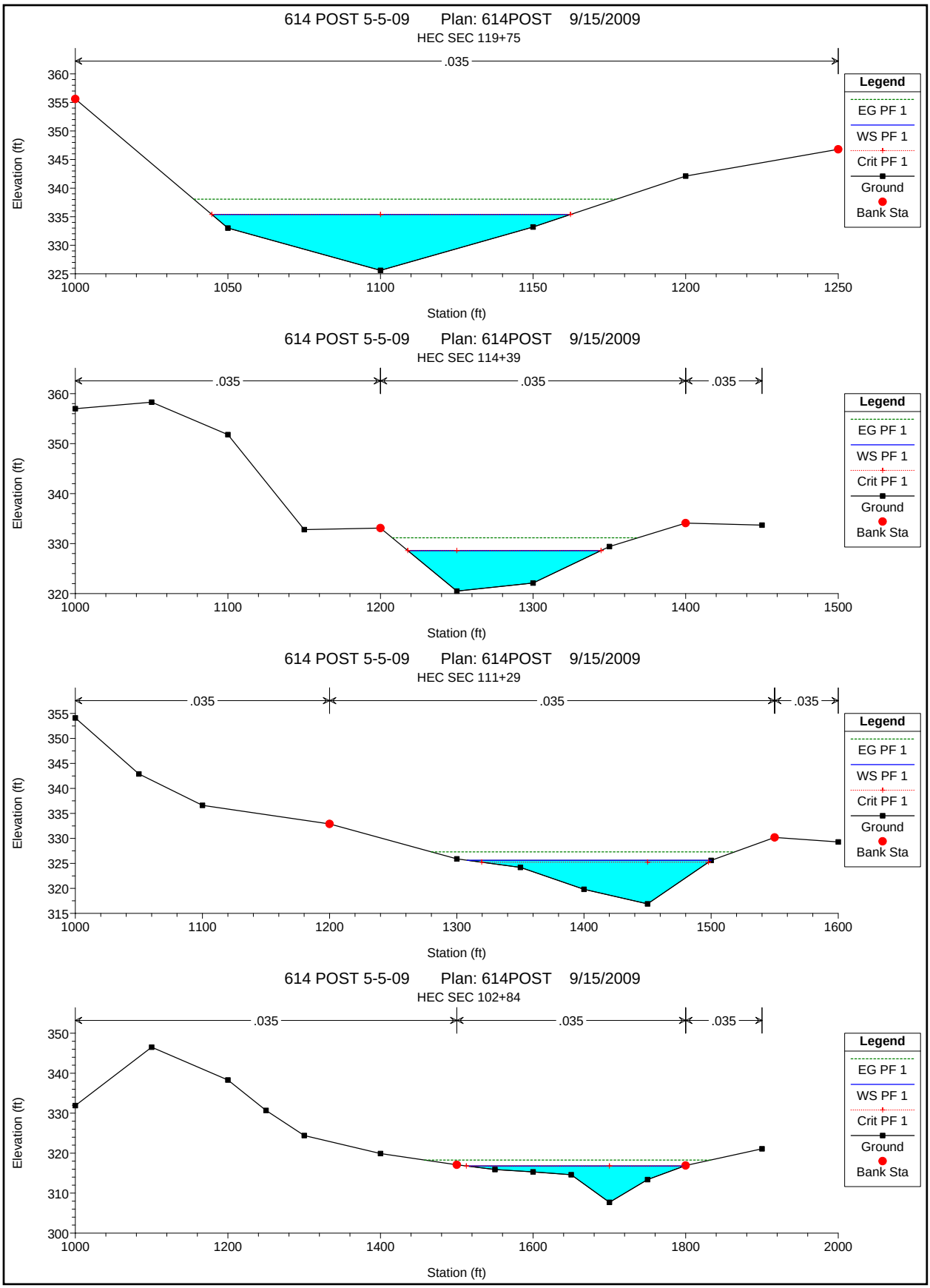
LANDMARK CONSULTING

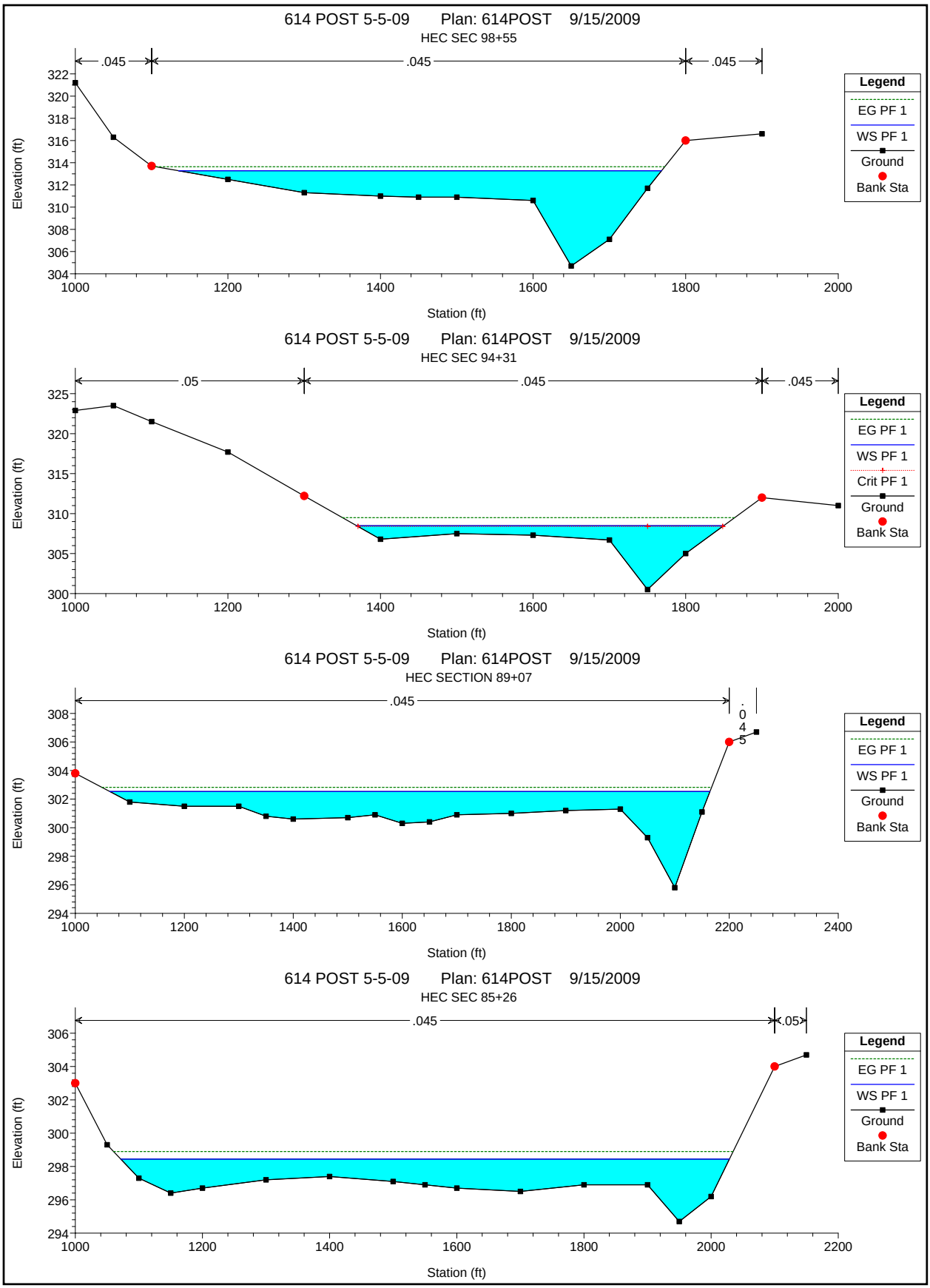
JAN. 6-14

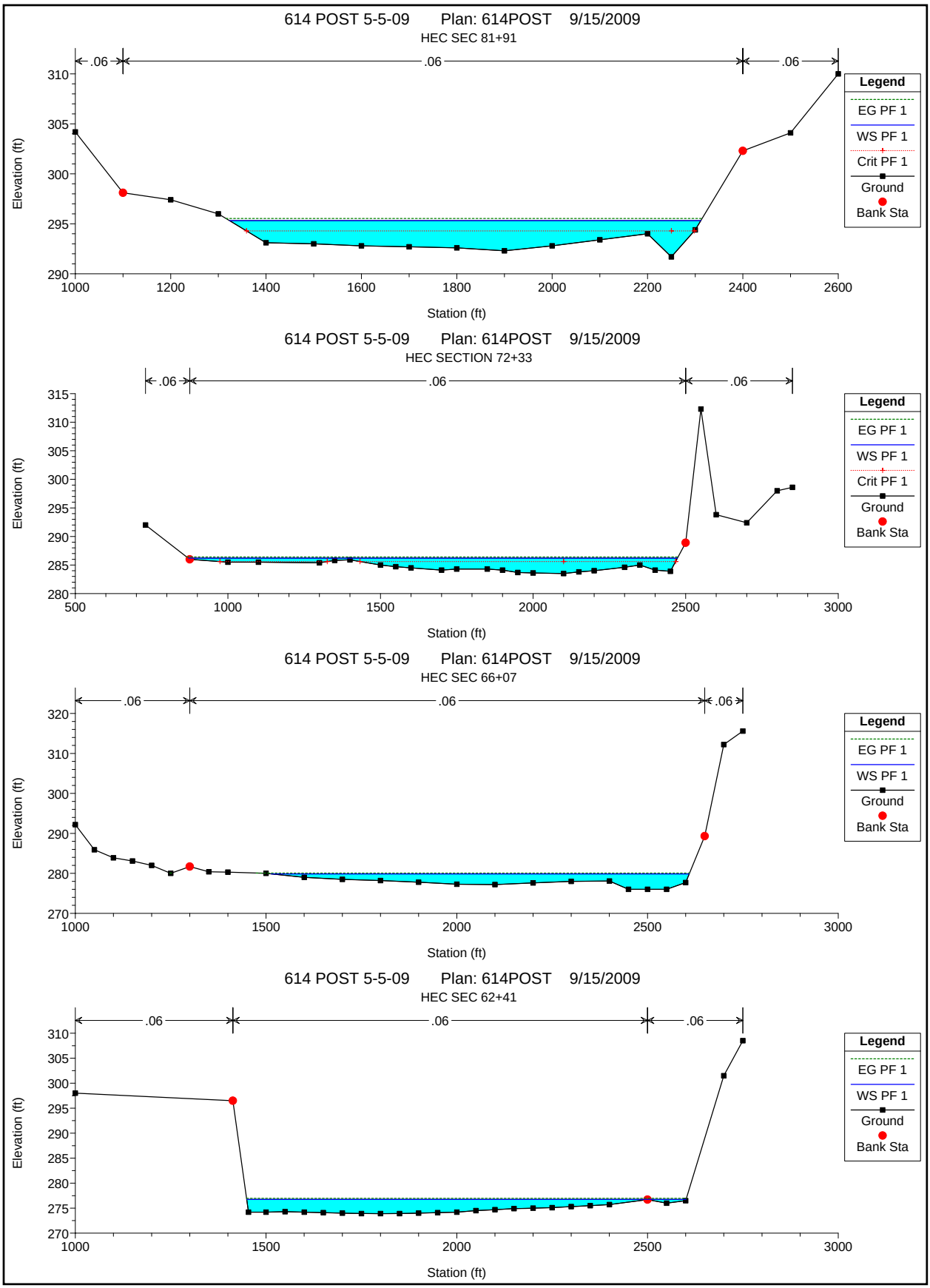
SECTION 9B:
HORSE RANCH CREEK HEC-RAS CALCS
POST-DEVELOPMENT CONDITIONS

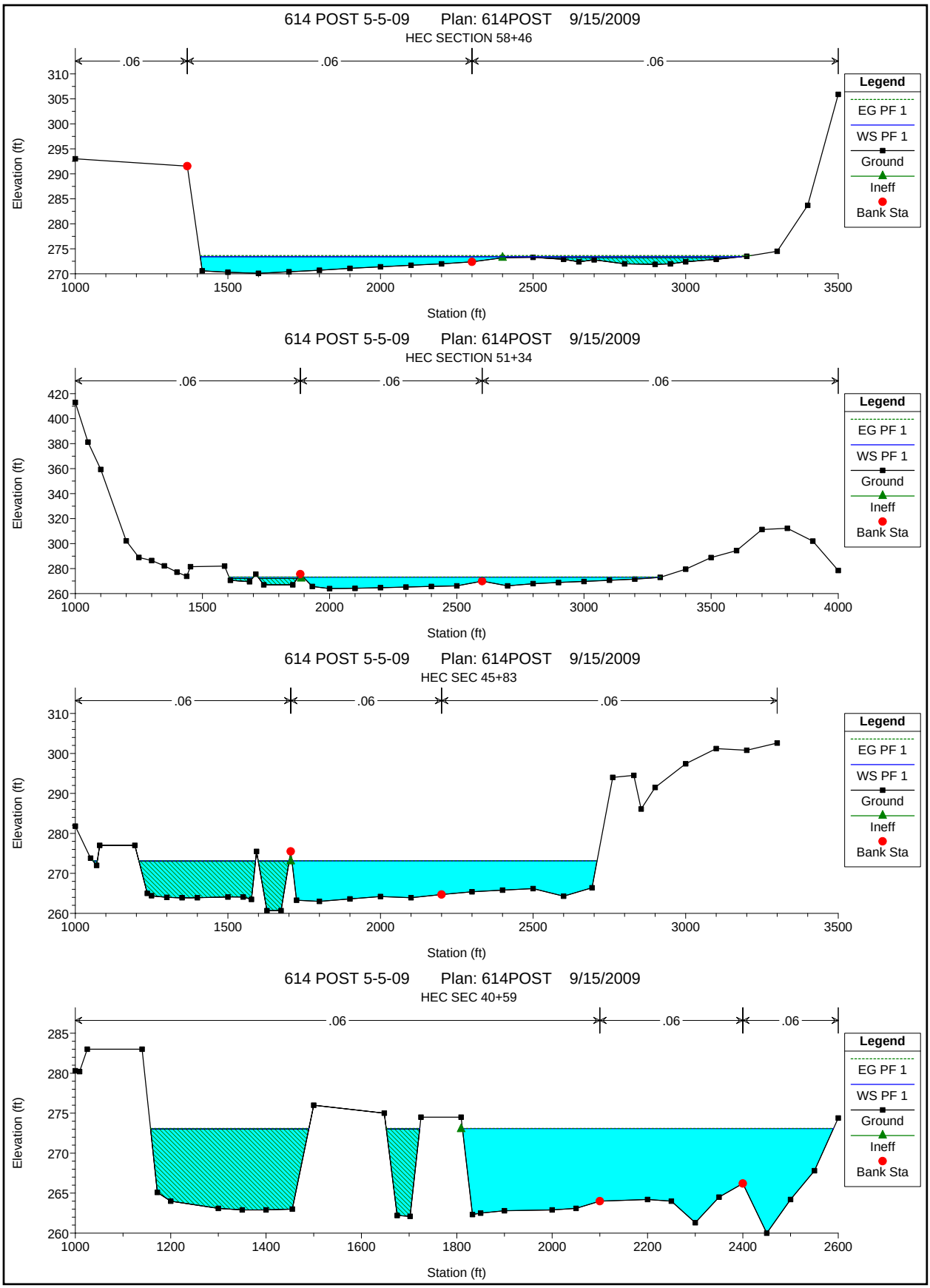
HEC-RAS Plan: 614POST River: HRC Reach: 1 Profile: PF 1

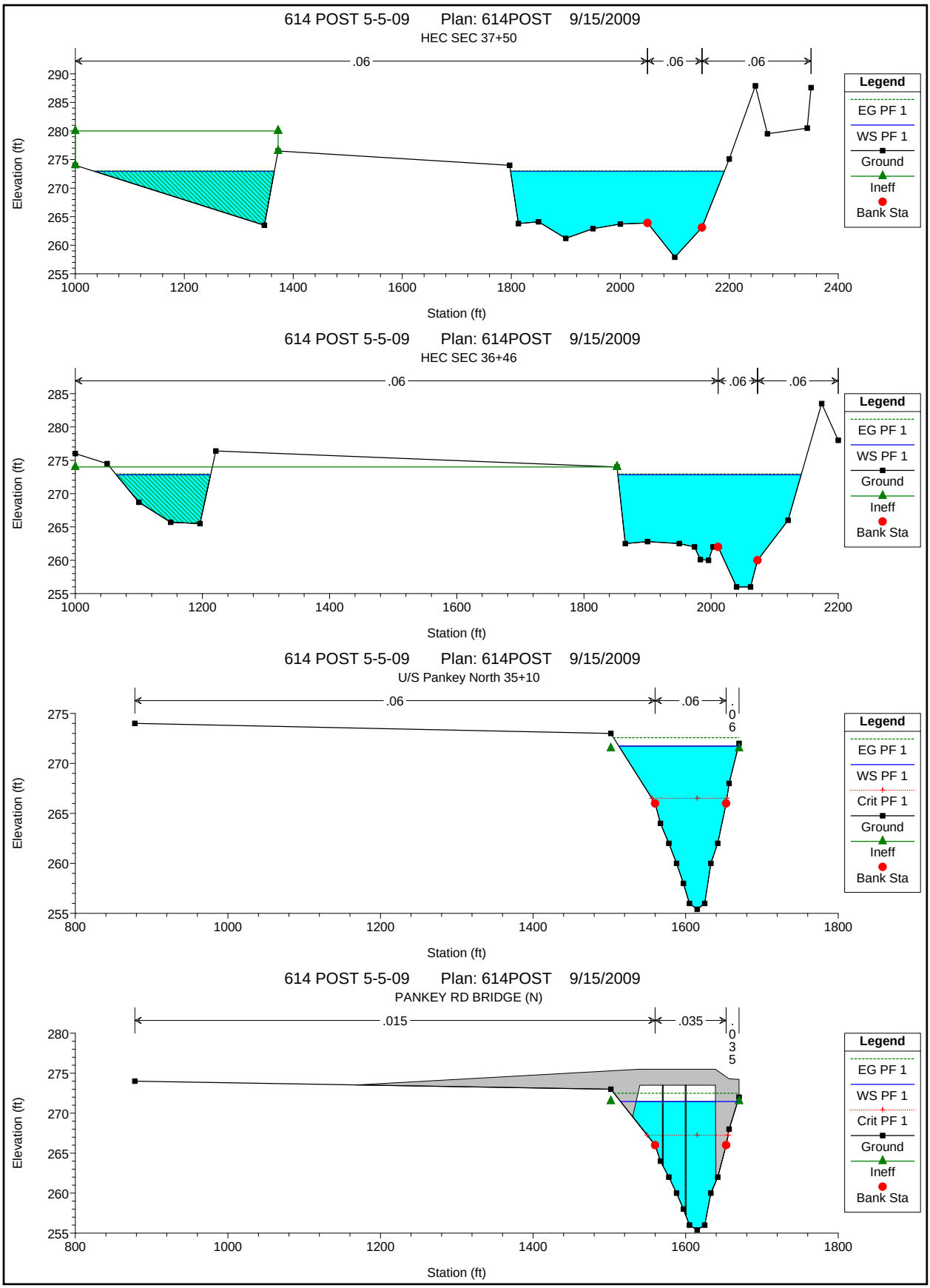
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	11975	PF 1	8168.00	325.60	335.38	335.38	338.05	0.010547	13.12	622.73	117.52	1.00
1	11439	PF 1	8203.00	320.50	328.61	328.61	331.15	0.010654	12.81	640.56	126.72	1.00
1	11129	PF 1	8238.00	316.90	325.62	325.23	327.30	0.009096	10.38	793.35	192.13	0.90
1	10284	PF 1	8274.00	307.70	316.80	316.80	318.28	0.012515	9.77	846.80	286.04	1.00
1	9855	PF 1	8309.00	304.70	313.28		313.64	0.005637	4.83	1721.47	633.01	0.52
1	9431	PF 1	8344.00	300.50	308.49	308.39	309.50	0.021391	8.05	1036.74	481.14	0.97
1	8907	PF 1	8379.00	295.80	302.53		302.82	0.007944	4.30	1947.53	1101.35	0.57
1	8526	PF 1	8414.00	294.70	298.44		298.90	0.014079	5.41	1554.60	957.32	0.75
1	8191	PF 1	8449.00	291.70	295.32	294.29	295.54	0.007448	3.72	2270.69	988.31	0.43
1	7233	PF 1	8485.00	283.50	286.19	285.60	286.40	0.012780	3.62	2346.61	1602.64	0.53
1	6607	PF 1	8520.00	276.00	279.87		280.08	0.008299	3.70	2302.47	1095.83	0.45
1	6241	PF 1	8555.00	273.90	276.75		276.97	0.008762	3.82	2268.69	1151.68	0.46
1	5846	PF 1	8590.00	270.10	273.40		273.65	0.008315	4.00	2303.54	1774.20	0.46
1	5134	PF 1	8626.00	264.00	273.21		273.23	0.000166	1.23	8193.53	1661.50	0.08
1	4583	PF 1	8661.00	263.00	273.14		273.16	0.000102	1.10	8437.02	1498.90	0.06
1	4059	PF 1	8696.00	261.30	273.07		273.09	0.000129	1.24	7109.74	1180.50	0.07
1	3750	PF 1	8731.00	257.90	272.93		273.02	0.000396	2.61	3818.09	722.07	0.13
1	3646	PF 1	8766.00	256.00	272.82		272.95	0.000539	3.46	3094.40	436.59	0.16
1	3510	PF 1	8800.00	255.40	271.73	266.51	272.58	0.003631	7.56	1272.79	156.63	0.39
1	3476		Bridge									
1	3447	PF 1	8800.00	255.30	270.59		271.74	0.004774	8.81	1081.82	121.20	0.45
1	3050	PF 1	8800.00	252.25	267.60		268.91	0.011521	9.77	1015.15	671.75	0.63
1	2846	PF 1	8800.00	252.30	267.21		267.51	0.002295	5.34	2457.17	614.89	0.30
1	2595	PF 1	8800.00	251.40	265.48	260.83	266.46	0.005555	7.92	1110.48	120.08	0.46
1	2525		Bridge									
1	2441	PF 1	8800.00	249.30	264.64		265.05	0.002765	5.95	2191.33	1088.41	0.33
1	2225	PF 1	8800.00	251.30	264.13		264.39	0.002775	5.17	2588.73	964.65	0.32
1	1989	PF 1	8800.00	250.30	262.08		263.07	0.009082	8.24	1223.95	425.90	0.57
1	1665	PF 1	8800.00	246.00	259.01	255.22	260.35	0.007123	9.33	974.76	128.29	0.52
1	1624		Bridge									
1	1580	PF 1	8800.00	246.00	257.68	254.02	258.69	0.005804	8.10	1101.13	132.47	0.47
1	1374	PF 1	8800.00	246.00	257.00	252.96	257.53	0.003601	6.13	1756.42	459.67	0.37

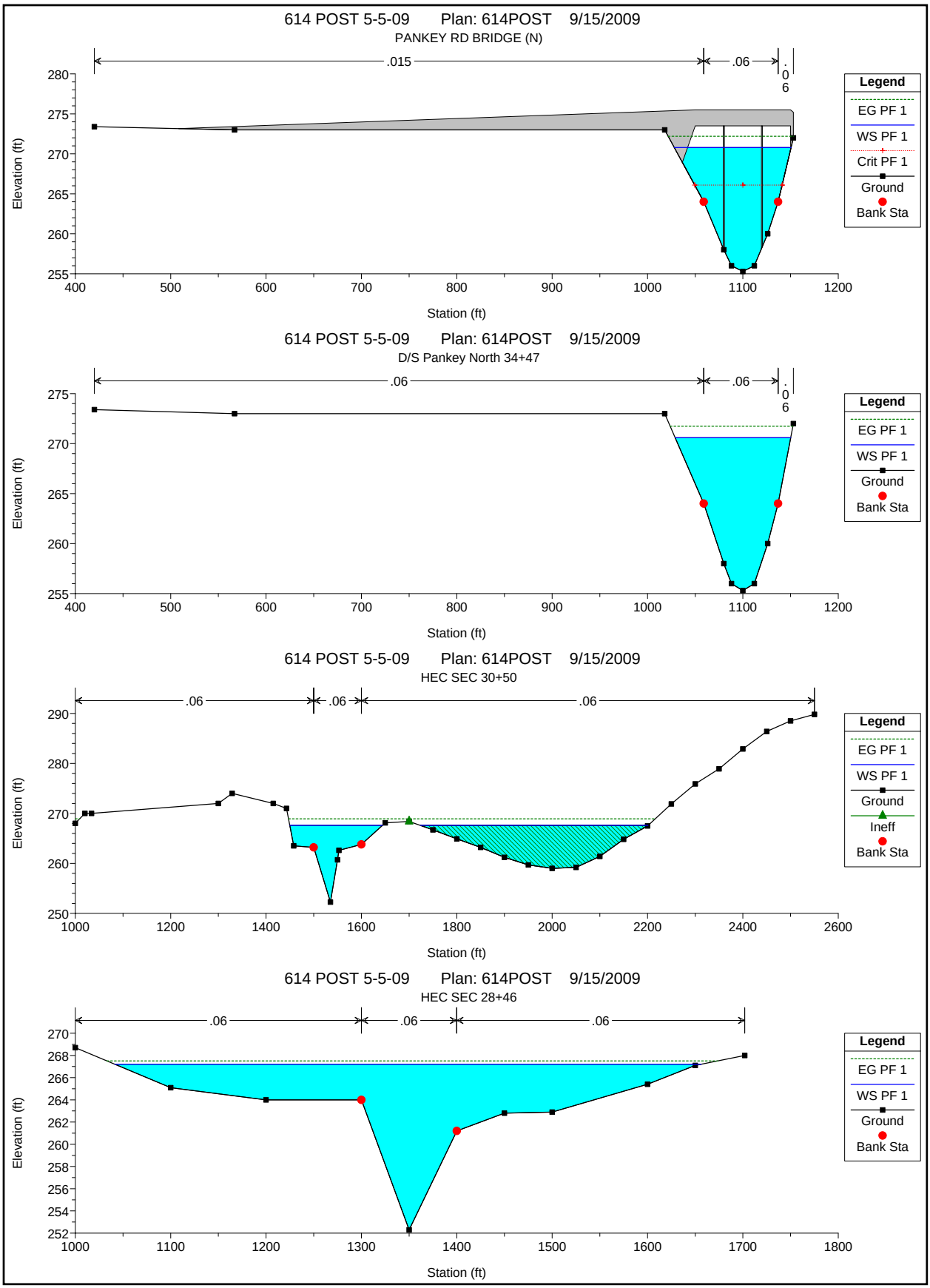

614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 119+75
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 114+39
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 111+29
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 102+84
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

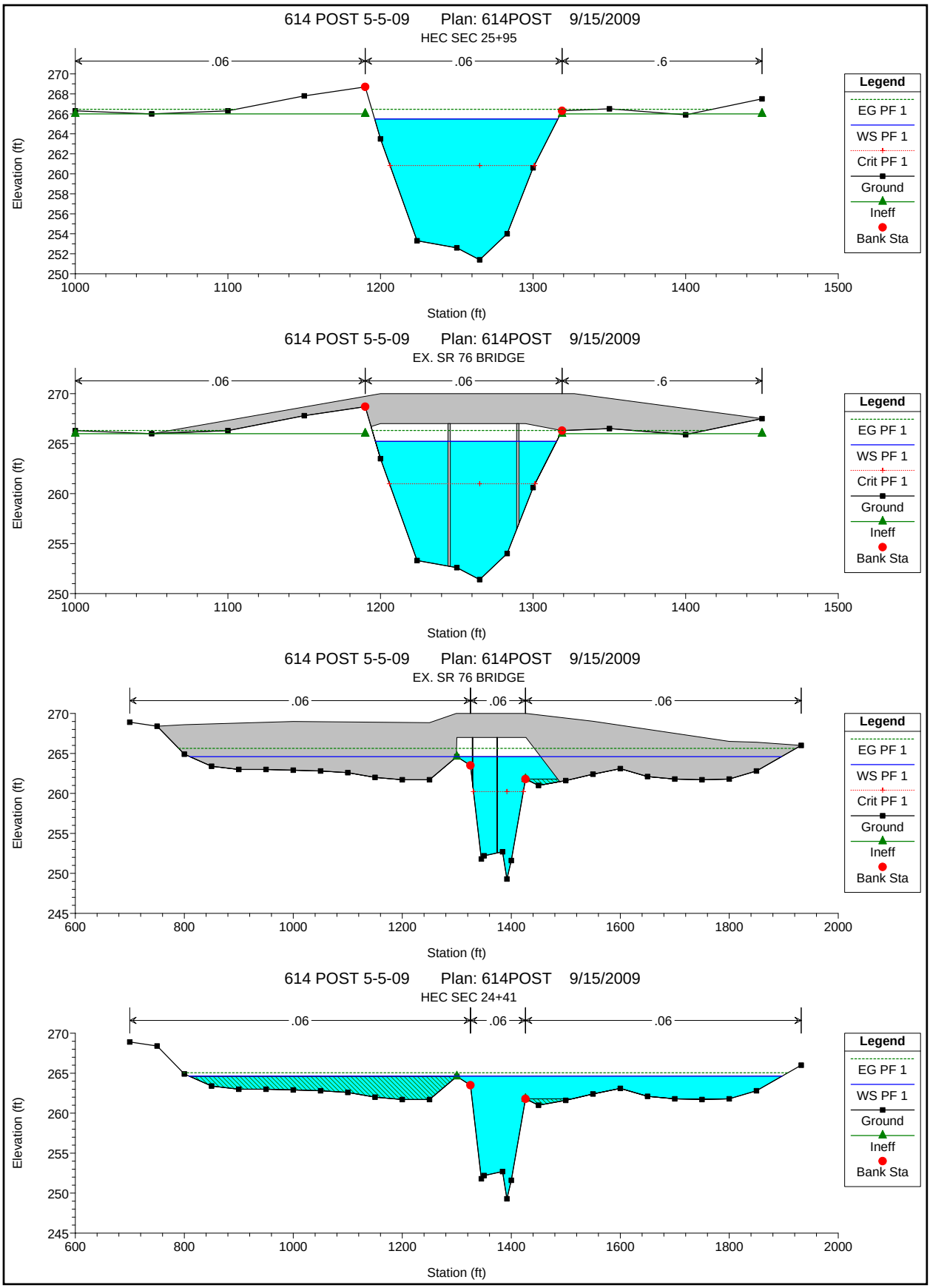

614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 98+55
.045
.045
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 94+31
.05
.045
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SECTION 89+07
.045
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 85+26
.045
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

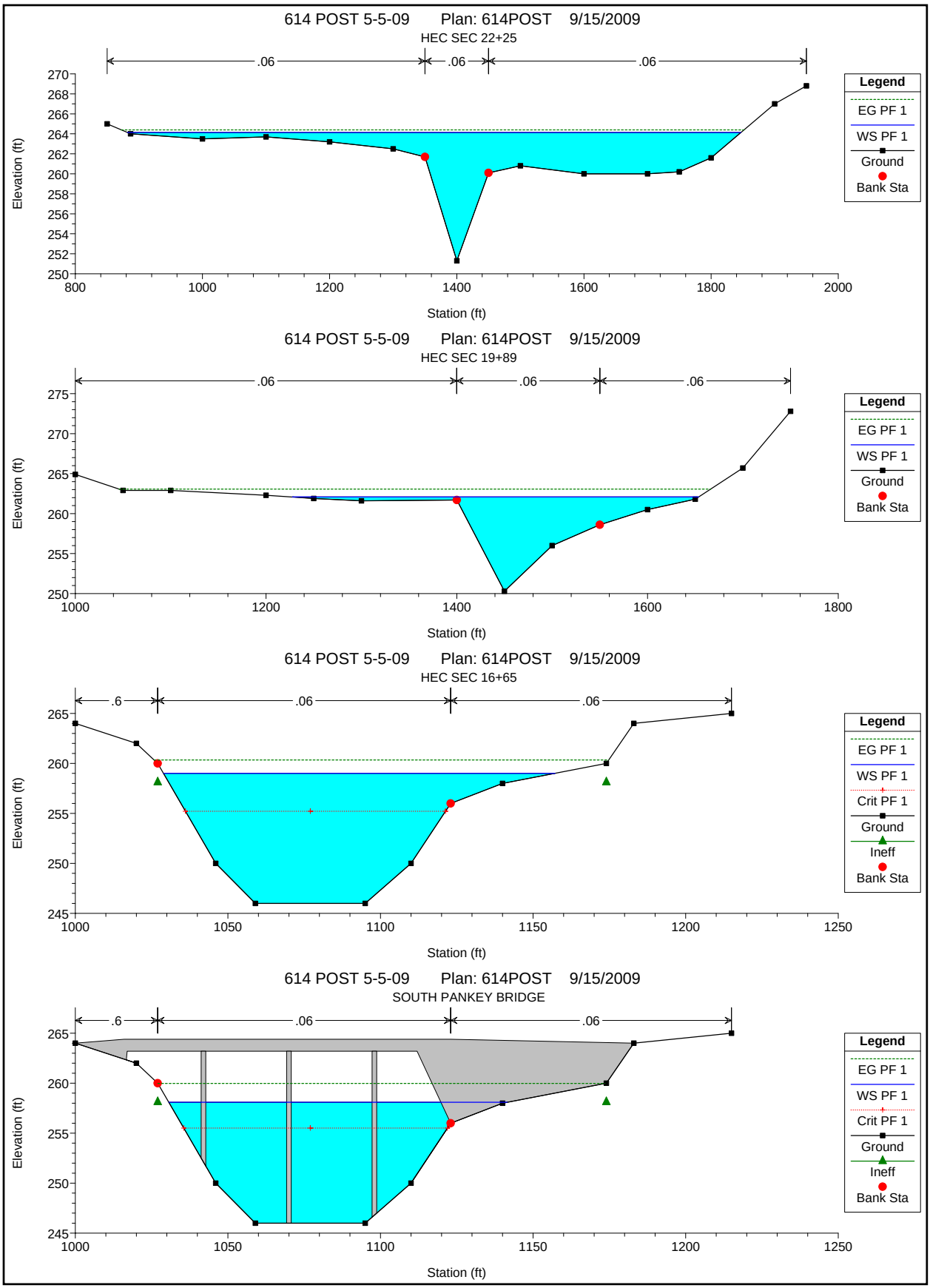

614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 81+91
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SECTION 72+33
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 66+07
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 62+41
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

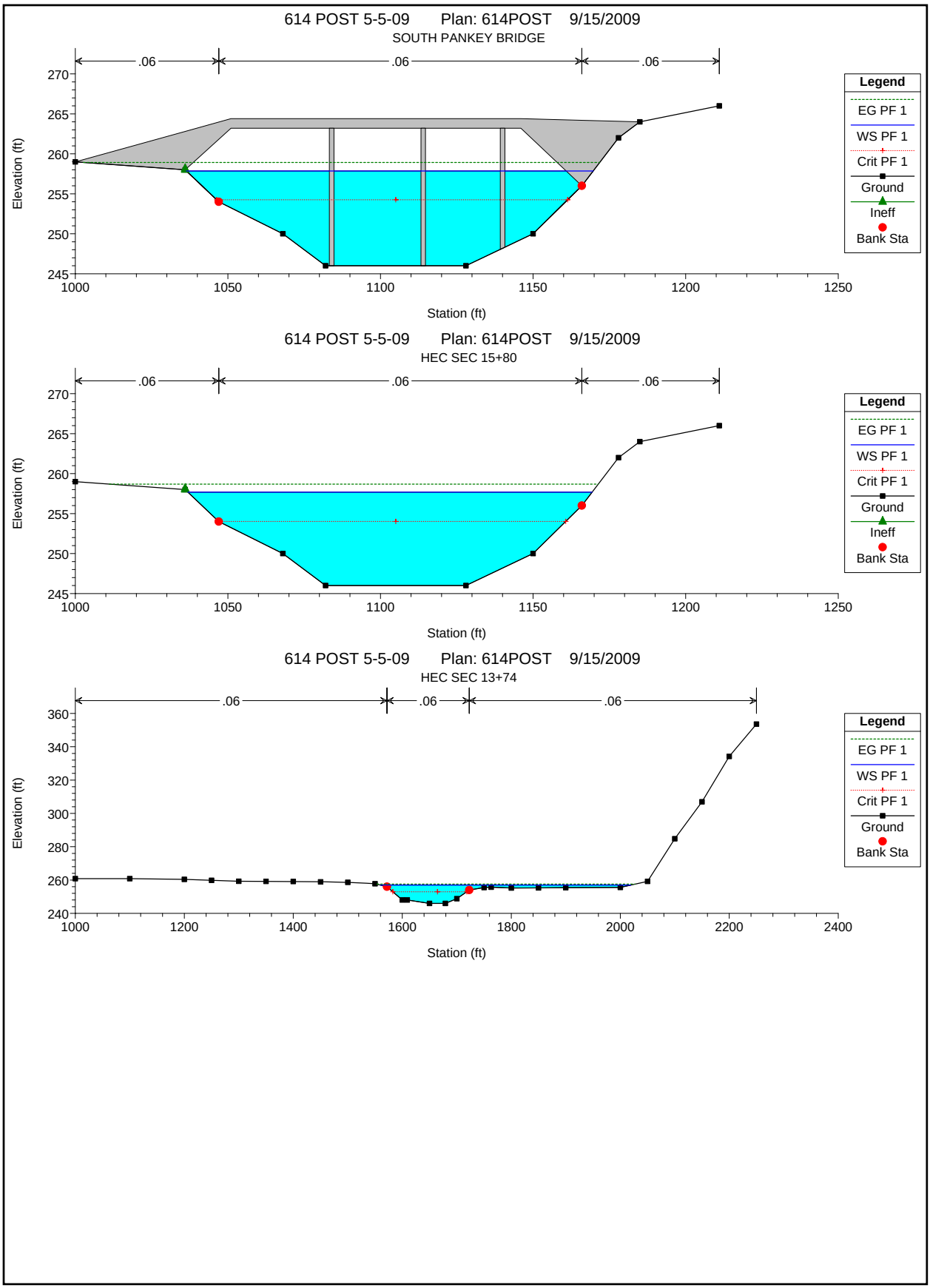

614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SECTION 58+46
.06
.06
.06
Elevation (ft)
310
305
300
295
290
285
280
275
270
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SECTION 51+34
.06
.06
.06
Elevation (ft)
420
400
380
360
340
320
300
280
260
1000
1500
2000
2500
3000
3500
4000
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 45+83
.06
.06
.06
Elevation (ft)
310
300
290
280
270
260
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 40+59
.06
.06
.06
Elevation (ft)
285
280
275
270
265
260
1000
1200
1400
1600
1800
2000
2200
2400
2600
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta


614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 37+50
.06
.06
.06
Elevation (ft)
290
285
280
275
270
265
260
255
1000
1200
1400
1600
1800
2000
2200
2400
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 36+46
.06
.06
.06
Elevation (ft)
285
280
275
270
265
260
255
1000
1200
1400
1600
1800
2000
2200
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
U/S Pankey North 35+10
.06
.06
.06
Elevation (ft)
275
270
265
260
255
800
1000
1200
1400
1600
1800
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
PANKEY RD BRIDGE (N)
.015
.035
.035
Elevation (ft)
280
275
270
265
260
255
800
1000
1200
1400
1600
1800
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


614 POST 5-5-09 Plan: 614POST 9/15/2009
PANKEY RD BRIDGE (N)
.015
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
D/S Pankey North 34+47
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 30+50
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 28+46
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 25+95
.06
.06
.6
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
EX. SR 76 BRIDGE
.06
.06
.6
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
EX. SR 76 BRIDGE
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 24+41
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

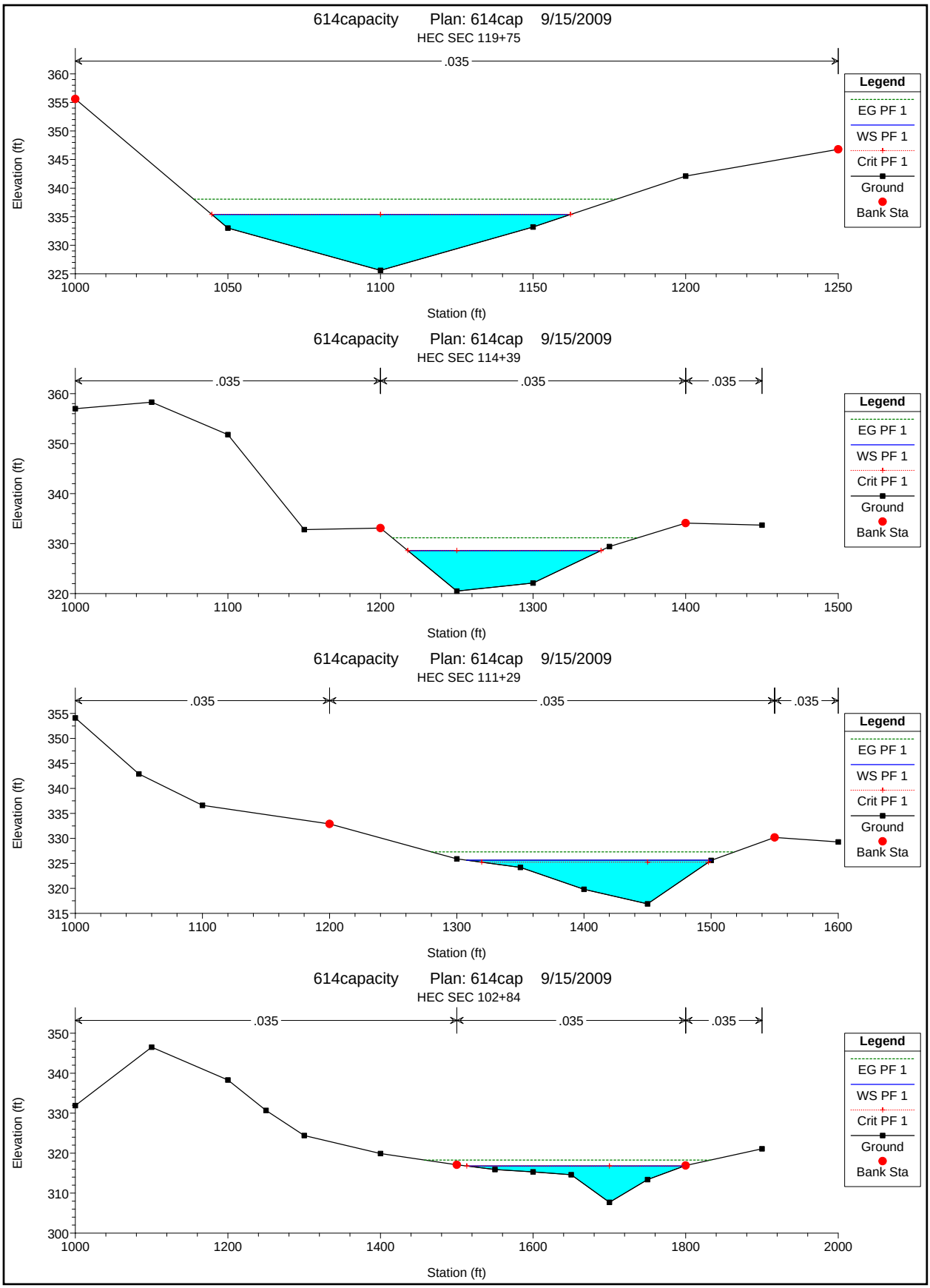

614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 22+25
.06
.06
.06
Elevation (ft)
270
268
266
264
262
260
258
256
254
252
250
800
1000
1200
1400
1600
1800
2000
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 19+89
.06
.06
.06
Elevation (ft)
275
270
265
260
255
250
1000
1200
1400
1600
1800
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 16+65
.6
.06
.06
Elevation (ft)
265
260
255
250
245
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
SOUTH PANKEY BRIDGE
.6
.06
.06
Elevation (ft)
265
260
255
250
245
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

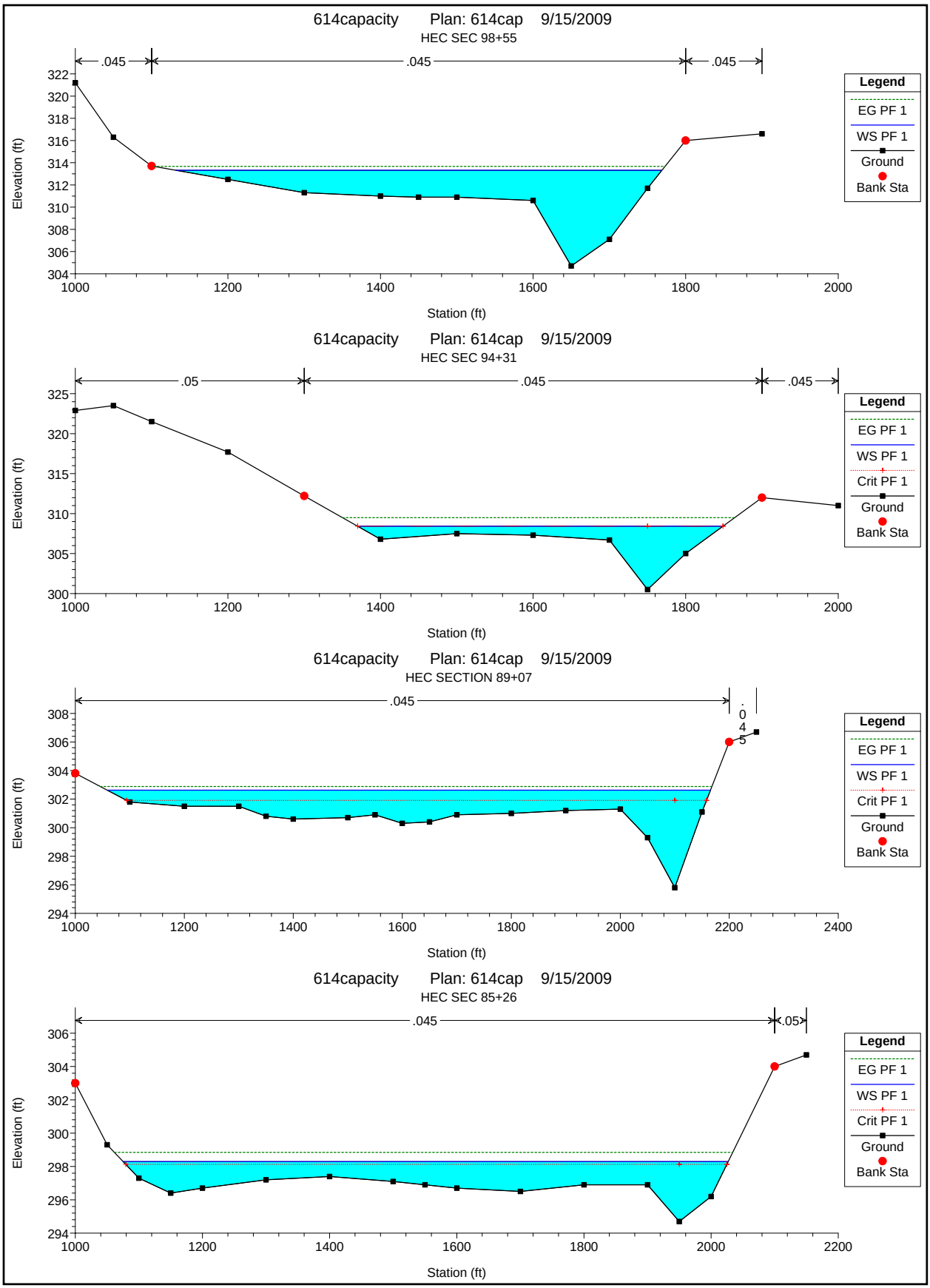

614 POST 5-5-09 Plan: 614POST 9/15/2009
SOUTH PANKEY BRIDGE
.06
.06
.06
Elevation (ft)
270
265
260
255
250
245
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 15+80
.06
.06
.06
Elevation (ft)
270
265
260
255
250
245
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614 POST 5-5-09 Plan: 614POST 9/15/2009
HEC SEC 13+74
.06
.06
.06
Elevation (ft)
360
340
320
300
280
260
240
1000
1200
1400
1600
1800
2000
2200
2400
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

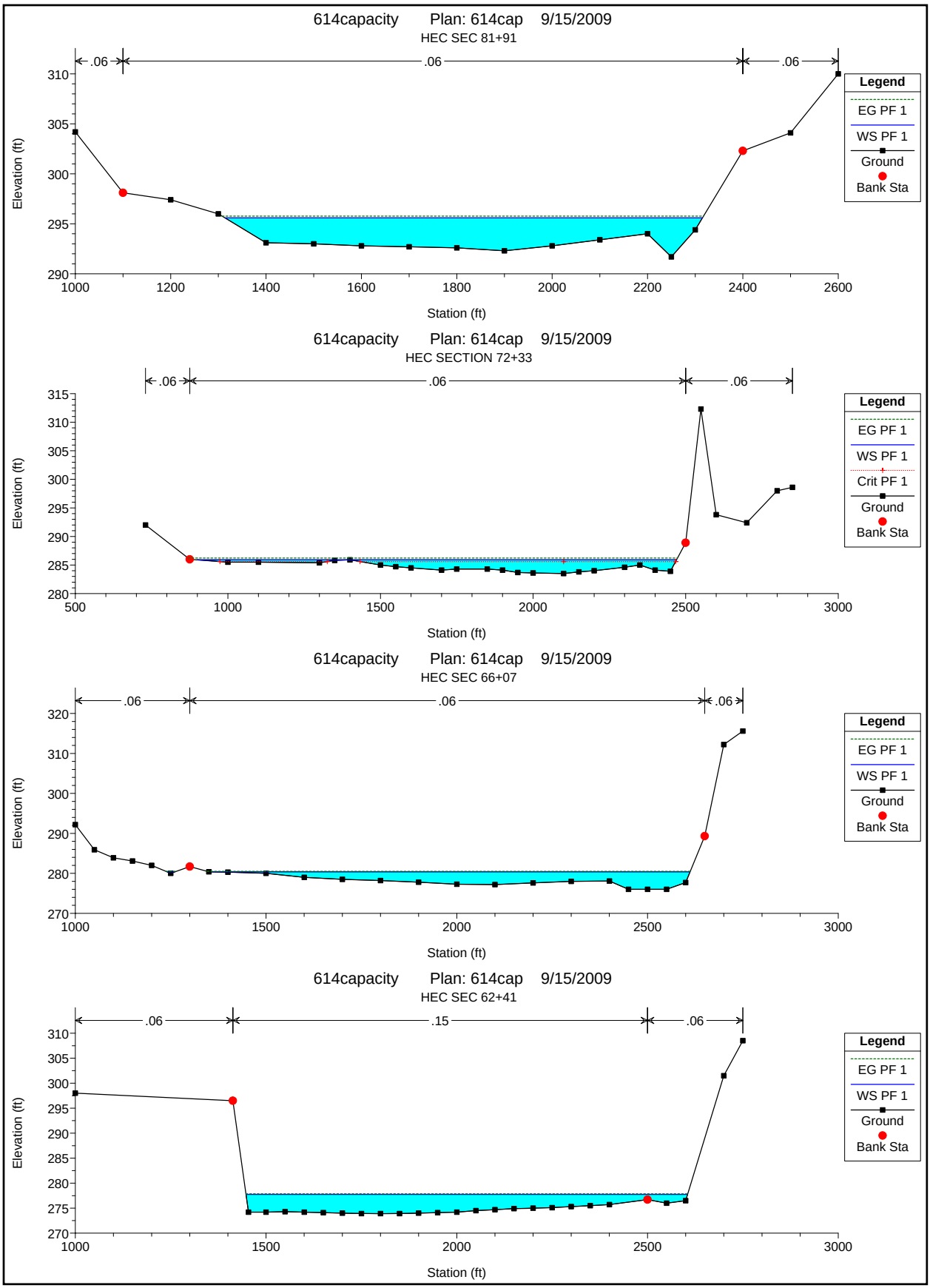
SECTION 9C:
HORSE RANCH CREEK HEC-RAS CALCS
CAPACITY CONDITIONS

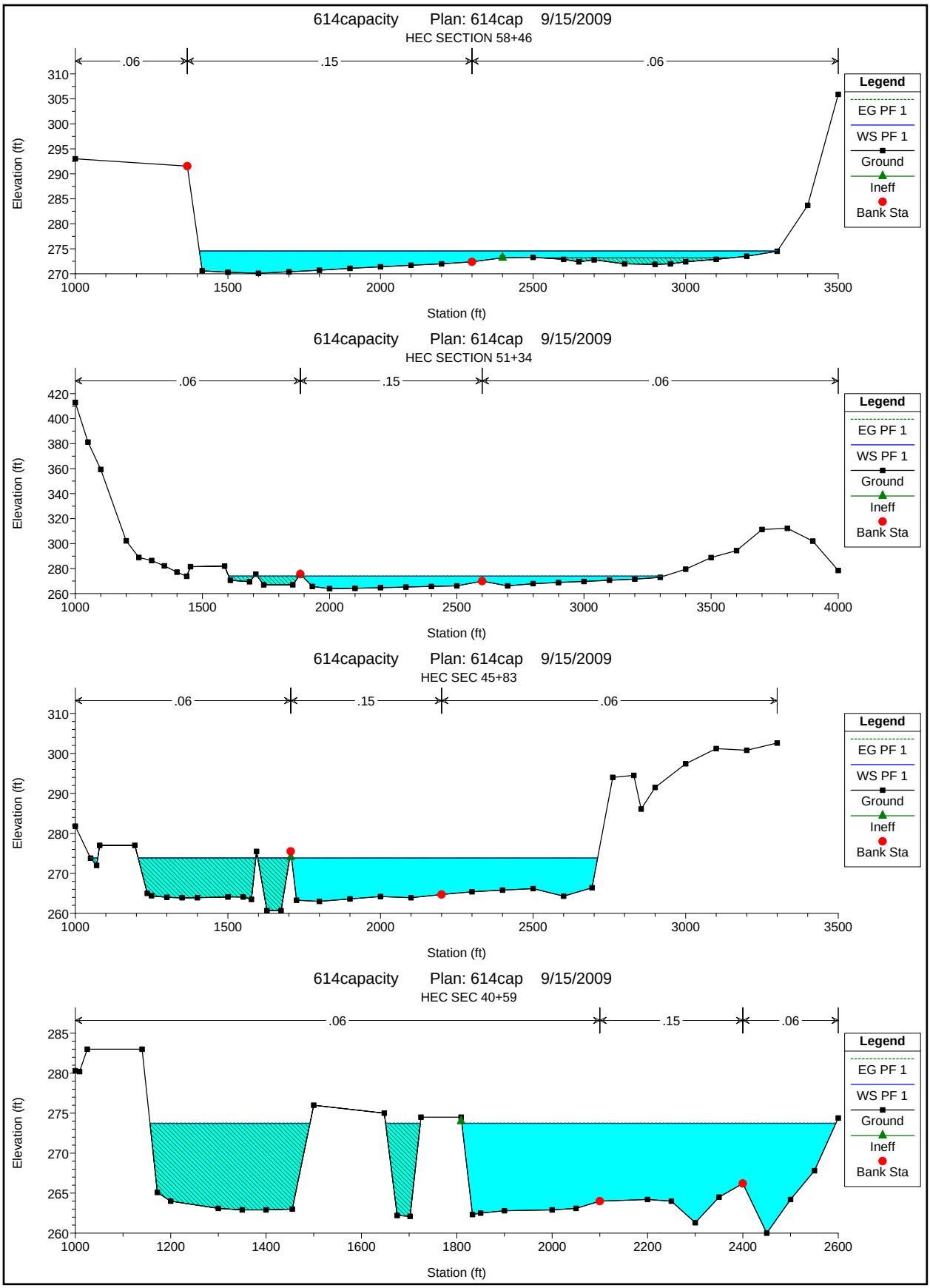
HEC-RAS Plan: 614capacity River: HRC Reach: 1 Profile: PF 1

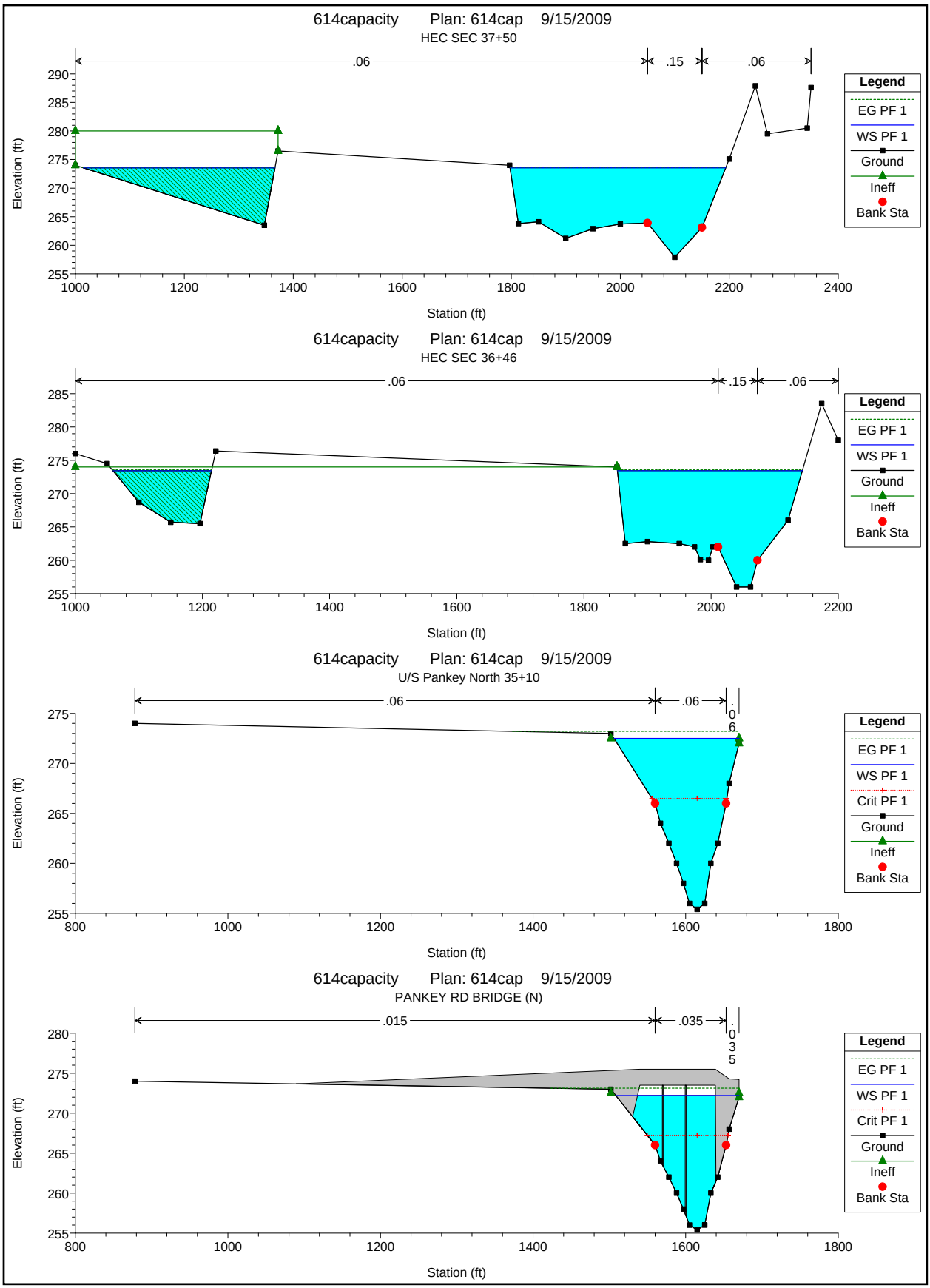
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	11975	PF 1	8168.00	325.60	335.38	335.38	338.05	0.010547	13.12	622.73	117.52	1.00
1	11439	PF 1	8203.00	320.50	328.61	328.61	331.15	0.010654	12.81	640.56	126.72	1.00
1	11129	PF 1	8238.00	316.90	325.64	325.23	327.30	0.009018	10.34	796.50	192.79	0.90
1	10284	PF 1	8274.00	307.70	316.78	316.78	318.28	0.012678	9.82	842.53	285.21	1.01
1	9855	PF 1	8309.00	304.70	313.32		313.67	0.005392	4.75	1749.14	637.15	0.51
1	9431	PF 1	8344.00	300.50	308.42	308.42	309.49	0.023692	8.31	1003.54	478.87	1.01
1	8907	PF 1	8379.00	295.80	302.63	301.91	302.89	0.006754	4.09	2048.85	1106.88	0.53
1	8526	PF 1	8414.00	294.70	298.30	298.13	298.85	0.019113	5.95	1415.09	951.80	0.86
1	8191	PF 1	8449.00	291.70	295.59		295.76	0.005220	3.33	2539.15	1001.03	0.37
1	7233	PF 1	8485.00	283.50	285.90	285.60	286.22	0.026162	4.52	1879.27	1570.29	0.73
1	6607	PF 1	8520.00	276.00	280.39		280.52	0.004575	2.93	2909.59	1275.56	0.34
1	6241	PF 1	8555.00	273.90	277.76		277.86	0.013283	2.44	3437.24	1157.59	0.24
1	5846	PF 1	8590.00	270.10	274.54		274.60	0.006233	1.80	4407.18	1893.69	0.17
1	5134	PF 1	8626.00	264.00	273.98		274.00	0.000372	0.78	9018.07	1689.78	0.05
1	4583	PF 1	8661.00	263.00	273.84		273.86	0.000180	0.61	9073.26	1517.14	0.03
1	4059	PF 1	8696.00	261.30	273.73		273.76	0.000177	0.61	7600.02	1192.88	0.03
1	3750	PF 1	8731.00	257.90	273.56		273.65	0.000529	1.25	4066.54	747.73	0.06
1	3646	PF 1	8766.00	256.00	273.44		273.57	0.000739	1.66	3274.59	445.96	0.07
1	3510	PF 1	8800.00	255.40	272.50	266.51	273.21	0.002853	6.99	1395.23	163.82	0.35
1	3476		Bridge									
1	3447	PF 1	8800.00	255.30	271.55	266.01	272.49	0.003583	8.03	1201.30	127.50	0.39
1	3050	PF 1	8800.00	252.25	268.98		269.69	0.018223	5.51	1630.19	769.83	0.33
1	2846	PF 1	8800.00	252.30	267.90		268.04	0.003462	2.75	2900.69	673.79	0.15
1	2595	PF 1	8800.00	251.40	265.91	260.83	266.80	0.004888	7.57	1162.92	123.81	0.43
1	2525		Bridge									
1	2441	PF 1	8800.00	249.30	265.31		265.56	0.001724	4.90	2933.31	1120.14	0.26
1	2225	PF 1	8800.00	251.30	264.93		265.06	0.002579	2.12	3382.60	1009.30	0.13
1	1989	PF 1	8800.00	250.30	263.47		263.80	0.013376	4.54	1984.00	635.66	0.28
1	1665	PF 1	8800.00	246.00	259.46	255.22	260.66	0.006165	8.88	1033.74	136.71	0.49
1	1624		Bridge									
1	1580	PF 1	8800.00	246.00	258.36	254.02	259.23	0.004559	7.53	1194.02	147.50	0.43
1	1374	PF 1	8800.00	246.00	257.00	252.96	257.40	0.016645	5.27	1756.42	459.67	0.32

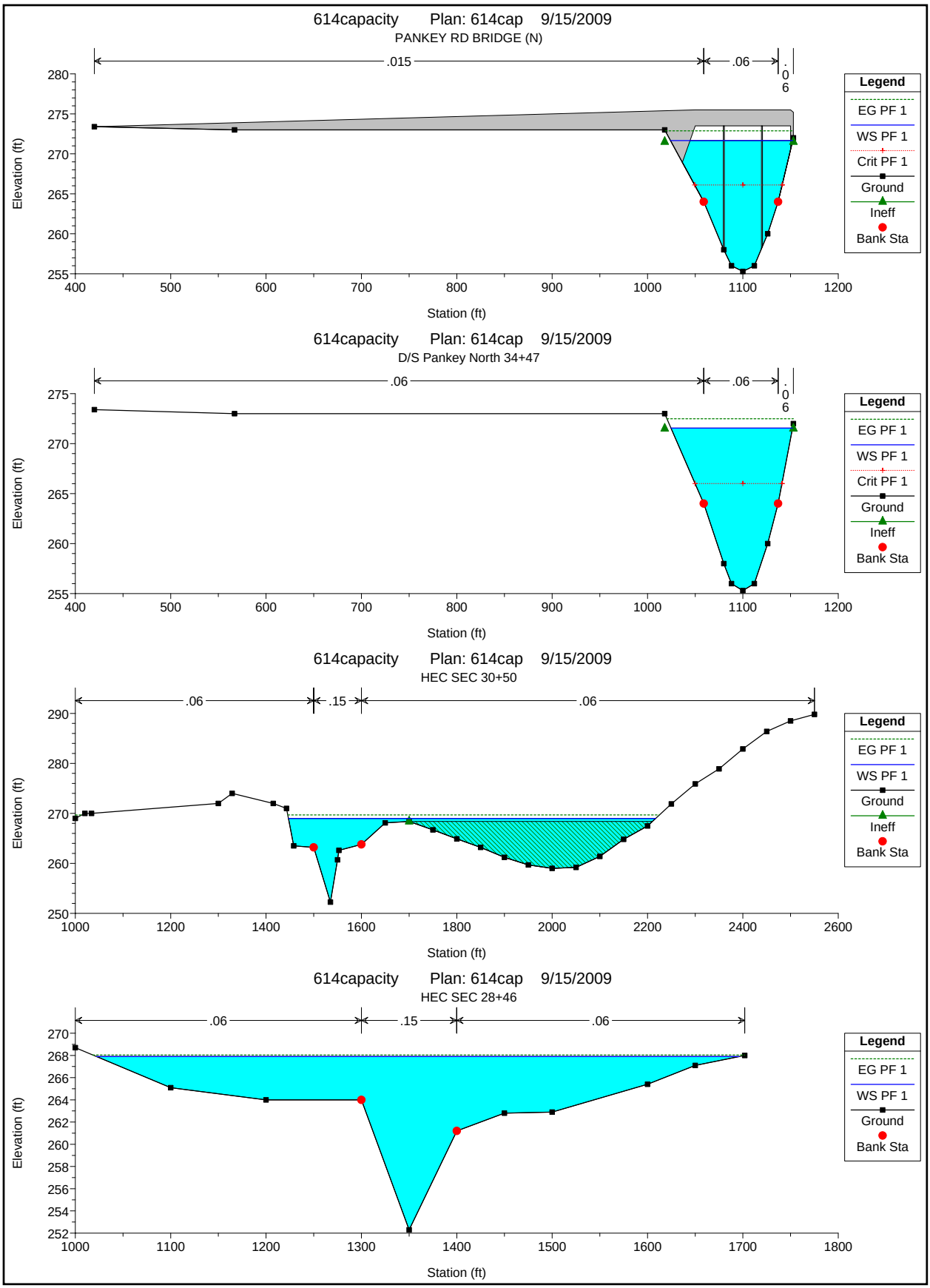

614capacity Plan: 614cap 9/15/2009
HEC SEC 119+75
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 114+39
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 111+29
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 102+84
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

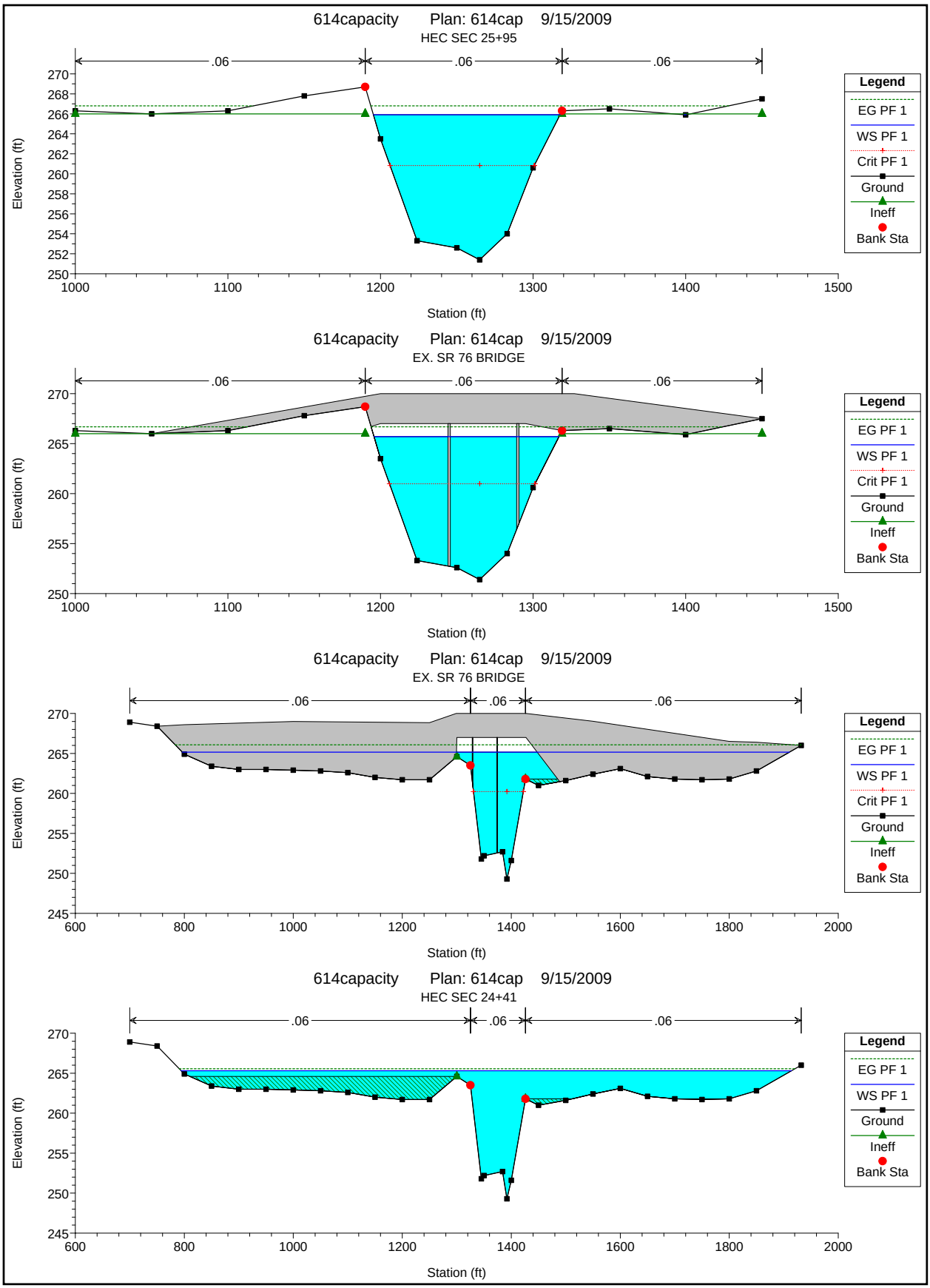

614capacity Plan: 614cap 9/15/2009
HEC SEC 98+55
.045
.045
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 94+31
.05
.045
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SECTION 89+07
.045
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 85+26
.045
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

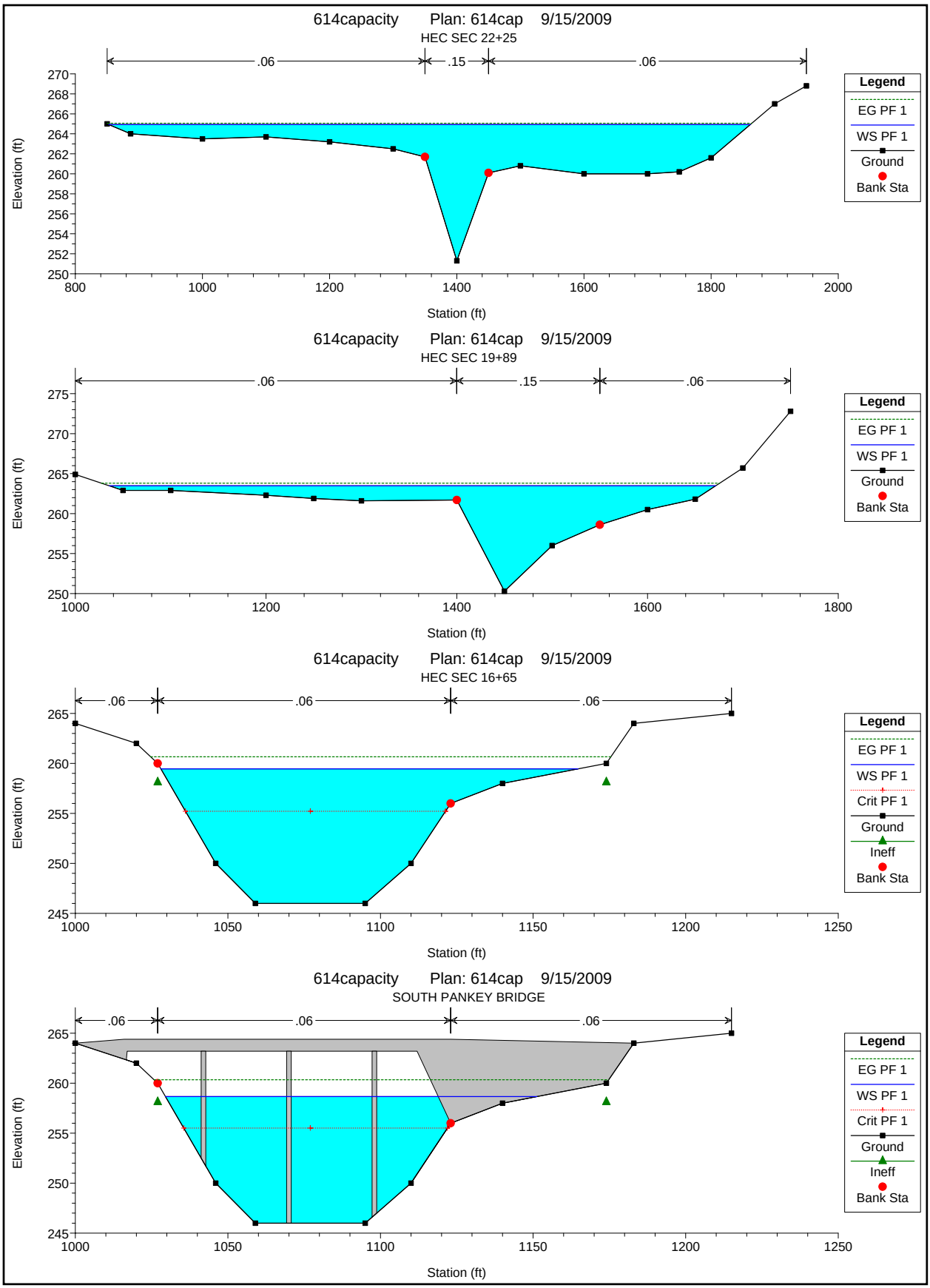

614capacity Plan: 614cap 9/15/2009
HEC SEC 81+91
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SECTION 72+33
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 66+07
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 62+41
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


614capacity Plan: 614cap 9/15/2009
HEC SECTION 58+46
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SECTION 51+34
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 45+83
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 40+59
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta


614capacity Plan: 614cap 9/15/2009
HEC SEC 37+50
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 36+46
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
U/S Pankey North 35+10
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
PANKEY RD BRIDGE (N)
.015
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


614capacity Plan: 614cap 9/15/2009
PANKEY RD BRIDGE (N)
.015
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
D/S Pankey North 34+47
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 30+50
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 28+46
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


614capacity Plan: 614cap 9/15/2009
HEC SEC 25+95
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
EX. SR 76 BRIDGE
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
EX. SR 76 BRIDGE
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 24+41
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta


614capacity Plan: 614cap 9/15/2009
HEC SEC 22+25
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 19+89
.06
.15
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
614capacity Plan: 614cap 9/15/2009
HEC SEC 16+65
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
614capacity Plan: 614cap 9/15/2009
SOUTH PANKEY BRIDGE
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta