DRAINAGE STUDY
FOR
SOUTHWEST VILLAGE VESTING TENTATIVE MAP

(PRELIMINARY ENGINEERING)

Job Number 15013-C

March 29, 2019
Revised: October 25, 2019
Revised: July 16, 2020
Revised: July 15, 2022
Revised: December 15, 2022
Revised: April 28, 2023
Revised: May 14, 2024

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Job Number 15013-C

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REVISION PAGE
May 14, 2024

The following comments have been provided by the City of San Diego on May 6th, 2024, and updates will be made to the two reports associated with these comments. The two reports include, the "Drainage Study for Southwest Village Vesting Tentative Map (VTM)", and the "Southwest Village Technical Memorandum Addressing Hydrology and Water Quality for Emergency Vehicle Access Road 'Project Alternative'", all dated May 14, 2024. The comments provided by the City of San Diego that are related to the Drainage Study are below with responses from Rick Engineering Company in bold.

Comment 69: Emergency Vehicle Access Rd - The technical memo addressing drainage and storm water should be included as an Appendix in the overall Drainage Study. Update the Table of Contents accordingly.

This technical memo has been added as Appendix J to the Drainage Study for Southwest Village Vesting Tentative Map and the table of contents has been updated to reflect this.

Comment 70: Emergency Vehicle Access Rd - The technical memo addressing drainage and storm water shall include sizing calculations for the rip rap, lined ditches and 18" storm drain.

Sizing calculations for energy dissipation will be provided during final engineering. Normal depth sizing for the lined ditches has been performed using Hydraulic Toolbox and it has been added as an Attachment to the Technical Memo for the Emergency Vehicle Access Road.

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REVISION PAGE
April 28, 2023

The following comments have been provided by the City of San Diego on March 3, 2023, and updates have been made to the three reports associated with these comments all dated December 15th, 2022. The three reports include, the "Conceptual Drainage and Water Quality Summary for Southwest Village Specific Plan", the "Drainage Study for Southwest Village Vesting Tentative Map (VTM)", and the "Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP) for Southwest Village Vesting Tentative Map (VTM)", all dated April 28, 2023. A meeting was held on November 10th, 2022, with the City of San Diego to review the comments previously provided and to develop concurrence on what should be addressed with the Vesting Tentative Map (VTM) submittal and what can be addressed with final engineering. Many of the comments received on March 3, 2023, are repeat comments that were previously discussed with the City and an approach agreed to. Below are the comments provided by the City of San Diego that are related to the Specific Plan with responses from Rick Engineering Company in bold.

Specific Plan / VTM Drainage Study / VTM PDP SWQMP

95. Prior to the issuance of any building permit, the owner/Permittee shall incorporate any construction Best Management Practices necessary to comply with Chapter 14, Article 2, Division 1 (Grading Regulations) of the Municipal Code, into the construction plans or specifications. (From Cycle 15)

Best Management Practices (BMPs) have been identified throughout the site to treat the proposed development. The BMPs for the VTM areas (Basin 100, 200, 300, and 1400) are shown on the civil plan sheets and approximate locations for the Specific Plan areas are also identified in the Conceptual Water Quality and HMP Exhibit that is apart of Map Pocket 3 of this report.

96. Prior to the issuance of any building permit, the Owner/Permittee shall submit a Technical Report that will be subject to final review and approval by the city engineer, based on the Storm Water Standards in effect at the time of the construction permit issuance. (From Cycle 15)

Comment noted. As the Specific Plan areas move towards preliminary engineering, technical reports will be developed for review and approval by the City Engineering staff that will comply with the Storm Water Standard in effect at that time.

97. Prior to the issuance of any building permit, the Owner/Permittee must enter into a Storm Water Management and Discharge Control Maintenance Agreement, which will be recorded in the property records of the county, satisfactory to the City Engineer. (From Cycle 15)

A draft Storm Water Management and Discharge Control Maintenance Agreement (SWMDCMA) has been included in attachment 3 of the PDPSWQMP document and will be recorded during the Final Engineering phase of this project.

98. Prior to the issuance of any building permit, the Owner/Permittee shall enter into a Maintenance Agreement for the ongoing permanent BMP maintenance, satisfactory to the City Engineer. (From Cycle 15)

A draft Maintenance Agreements has been included in attachment 3 of the PDPSWQMP document and will be recorded during the Final Engineering phase of this project.

102. The drainage system proposed for this development, as shown on the site plan, is subject to approval by the City Engineer. (From Cycle 15)

The project engineers have met with City staff extensively on this project and most recently on November 10th, 2022 to discuss the drainage system for this project and explain the complexities that are introduced with the landslide area directly to the west of Basin 300.

104. Development of this project shall comply with all storm water construction requirements of the State Construction General Permit, Order No. 2009-0009-DWQ, or subsequent order, and the Municipal Storm Water Permit, Order No. R9-2013-0001, or subsequent order. In accordance with Order No. 2009-0009DWQ, or subsequent order, a Risk Level Determination shall be calculated for the site and a Storm Water Pollution Prevention Plan (SWPPP) shall be implemented concurrently with the commencement of grading activities. (From Cycle 15)

The project will be in compliance with the State Construction General Permit, Order No. 2009-0009-DWQ, or subsequent order, and the Municipal Storm Water Permit, Order No. R9-2013-0001, or subsequent order including a SWPPP and a Risk Level Determination, which will be completed during the Final Engineering phase of this project.

105. Prior to issuance of a grading or a construction permit, a copy of the Notice of Intent (NOI) with a valid Waste Discharge ID number (WDID#) shall be submitted to the City of San Diego as a proof of enrollment under the Construction General Permit. When ownership of the entire site or portions of the site changes prior to filing of the Notice of Termination (NOT), a revised NOI shall be submitted electronically to the State Water Resources Board in accordance with the provisions as set forth in Section II.C of Order No. 2009-0009-DWQ and a copy shall be submitted to the City. (From Cycle 15)

The project will prepare and NOI with a valid WDID number as proof of enrollment under the CGP and will be prepared during the Final Engineering phase of the project.

106. The Subdivider shall enter into an agreement to indemnify, protect, and hold harmless the City, its officials and employees from any and all claims, demands, causes or action, liability or loss because of, or arising out of surface drainage entering into the property from the Right-of-Way due to the current drainage/ storm water design. (From Cycle 15)

In the locations where public storm drain systems cross into private lots, EMRAs will be provided so that the City will be able to maintain the public system. A hold harmless agreement can also be prepared and entered into with the City of San Diego.

139. The Subdivider shall demonstrate that mitigated peak flow rates for the 5, 10, 25, 50 and 100-year design storms do not exceed pre-project runoff rates at each outfall location. The pre-project runoff rate limit at each storm drain outfall should coincide with existing conditions, before any development has commenced in the Specific Plan, and not a future phased condition. (New Issue)

This has been previously addressed with the City of San Diego. The City of San Diego will be responsible for reviewing hydrologic and hydraulic studies and design features for conformance to criteria given in the "Drainage Design Manual" for every map or permit for which discretionary approval is sought from the City of San Diego. These project specific studies for each development will need to address potential impacts to downstream storm drainage facilities with sufficient detail to support the discretionary action. In addition, the new development projects will need to be able to demonstrate that the 50-year and 100-year detention requirements have been addressed (in order to satisfy the design criteria of the CPU Drainage Study). Additionally, the drainage area flowing into Mexico at the Spring Canyon concentration point and will need to comply with the US/Mexico International flood control detention requirements (i.e. – 5, 10, 25, 50, & 100-year storm events).

140. The Subdivider shall fully document all diversions of drainage area between the main watershed areas of the site. (New Issue)

This has been previously coordinated with the City of San Diego and in both the Drainage Study as well as the PDPSWQMP diversion maps are provided showing the area that is being diverted to Moody Canyon and Spring Canyon. It should also be noted that detention and hydromodification management are provided at each POC.

141. The Subdivider shall utilize Conjunctive Use guidelines for detention basin modeling of all mixed-use detention basins. (New Issue)

The guidelines for conjunctive use have been used when preparing the detention modeling for the VTM areas. Please see Appendix F of the Drainage Study.

142. The Subdivider shall demonstrate all proposed drainage basins have access and fencing provided to meet City criteria. (New Issue)

The proposed BMPs for the VTM area as shown in the PDPSWQMP are a combination of underground storage and compact biofiltration. Basin 1400 has an above ground biofiltration basin at the end of Beyer Road. This basin has an access road as shown on the plan sheets. Fencing guidelines have been followed per the City of San Diego City criteria.

143. The Subdivider shall provide a hydraulic analysis downstream at each storm drain outfall in the Spring, Moody, and Dillon Creek watersheds demonstrating proposed condition floodplain limits and channel velocities. (New Issue)

This has been previously coordinated with the City on the November 10th, 2022 meeting. Approximate floodplain limits have been provided for Moody Canyon, and the backup has been provided in the report titled, "Drainage Study for Southwest Village Vesting Tentative Map (VTM)" dated April 28, 2023. Please refer to Appendix I for additional information and to the exhibit in Map Pocket 2 for the mark up of the approximate floodplain limits. Once the areas tributary to Dillion Canyon are developed additional analysis can be done. If Spring Canyon were to be considered, a watershed wide approach would be necessary to accurately map the floodplain, including in-depth hydraulic analysis of the culvert that crosses from the US into Mexico.

144. The Subdivider shall provide a hydraulic analysis downstream at each storm drain outfall involving a diversion of drainage area or an increase in any of the analyzed peak flows as compared to pre-project conditions. (New Issue)

All project areas, including those where diversion occurs, is subject to both detention and hydromodification requirements. The new development projects will need to be able to demonstrate that the 50-year and 100-year detention requirements have been addressed (in order to satisfy the design criteria of the CPU Drainage Study). Additionally, the drainage area flowing into Mexico at the Spring Canyon concentration point and will need to comply with the US/Mexico International flood control detention requirements (i.e. – 5, 10, 25, 50, & 100-year storm events). With these requirements in place the post-project peak flows are anticipated to be less than or equal to the pre-project flows.

145. The Subdivider shall provide detailed energy dissipation analysis at each storm drain outfall to ensure proper receiving water protection from discharges of the 100-year design storm. (New Issue)

This comment has been previously coordinated with the City of San Diego. Outfalls from the VTM area Basin 100 and Basin 200 will be directed through an SDD-105 and Basin 300 will be directed down Beyer Road to a biofiltration basin located adjacent to Beyer Park. Additional analysis for other project areas will be considered as those pads are developed in the Specific Plan area and additional analysis will be performed in final engineering for each of the VTM outfalls.

DRAINAGE STUDY
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REVISION PAGE
December 15, 2022

The following comments have been provided by the City of San Diego on October 10th, 2022, and updates will be made to the three reports associated with these comments. The three reports include, the "Conceptual Drainage and Water Quality Summary for Southwest Village Specific Plan", the "Drainage Study for Southwest Village Vesting Tentative Map (VTM)", and the "Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP) for Southwest Village Vesting Tentative Map (VTM)", all dated December 15, 2022. A meeting was held on November 9th, 2022, with the City of San Diego to review the comments provided and to develop concurrence on what should be addressed with the Vesting Tentative Map (VTM) submittal and what can be addressed with final engineering. The comments provided by the City of San Diego that are related to the Drainage Study are below with responses from Rick Engineering Company in bold.

Specific Plan / VTM Drainage Study / VTM PDP SWQMP

120. The following are comments from the Deputy City Engineer on the 3 drainage/storm water reports: (New Issue)

Comment noted. The follow comments relate to the Specific Plan, the VTM Drainage Study, and the VTM PDPSWQMP reports.

121. For each proposed storm drain outfall location, provide the pre-project drainage area and 100-year peak runoff rates along with the post-project drainage area and 100-year unmitigated and mitigated peak runoff rates. The table should include a column to reflect diversion of drainage areas and peak flow changes. (New Issue)

The Specific Plan document includes a summary of the 100-year peak runoff rates along with drainage area for the pre and the post project condition. Please refer to Map Pocket 2 of the report titled, "Conceptual Drainage and Water Quality Summary for Southwest Village Specific Plan" dated December 15, 2022. The VTM specific Drainage Study includes both the unmitigated and the mitigated flow rates please refer to Table 2.1 and Table 4.1 as well as the exhibits in Map Pocket 2. For the specific plan, final calculations for the mitigated peak will be performed as each area is developed.

122. For each of the main receiving waters (Dillon Canyon, Spring Canyon, Moody Canyon, and site drainages toward Beyer/San Ysidro Blvd), provide the pre-project drainage area and 100-year peak runoff rates along with the post-project drainage area and 100-year unmitigated and mitigated peak runoff rates. The table should include a column to reflect diversion of drainage areas and peak flow changes as a result of the proposed Specific Plan development. (New Issue)

An overall exhibit has been provided in the Specific Plan report that summarizes pre and post project drainage to the main receiving waters. Please refer to Map Pocket 2 in the report titled, "Conceptual Drainage and Water Quality Summary for Southwest Village Specific Plan" dated December 15, 2022.

123. Detail how the Specific Plan will implement peak flow attenuation routing and adhere to the regional Conjunctive Use Guidelines for mixed use drainage facilities. (New Issue)

For the Specific Plan, peak flow attenuation routing will be developed at a later date when the each of the subsequent areas are considered. The regional conjunctive use guidelines will be followed based on the most recent City of San Diego Stormwater Standards manual (currently dated May 2021).

125. Detention routing for multiple storm events (100-year plus lower intensity runoff events) will be required. (New Issue)

The City of San Diego will be responsible for reviewing hydrologic and hydraulic studies and design features for conformance to criteria given in the "Drainage Design Manual" for every map or permit for which discretionary approval is sought from the City of San Diego. These project specific studies for each development will need to address potential impacts to downstream storm drainage facilities with sufficient detail to support the discretionary action. In addition, the new development projects will need to be able to demonstrate that the 50-year and 100-year detention requirements have been addressed (in order to satisfy the design criteria of the CPU Drainage Study). Additionally, the drainage area flowing into Mexico at the Spring Canyon concentration point and will need to comply with the US/Mexico International flood control detention requirements (i.e. – 5, 10, 25, 50, & 100-year storm events).

126. Provide approximate floodplain limits and channel velocities in Dillon Canyon, Spring Canyon, and Moody Canyon downstream of the project outfalls based on the total post-project runoff rates (onsite plus offsite runoff). (New Issue)

Approximate floodplain limits have been provided for Moody Canyon, and the back up has been provided in the report titled, "Drainage Study for Southwest Village Vesting Tentative Map (VTM)" dated December 15, 2022. Please refer to Appendix I for additional information and to the exhibit in Map Pocket 2 for the mark up of the approximate floodplain limits. Once the areas tributary to Dillion Canyon are developed additional analysis can be done. If Spring Canyon were to be considered, a watershed wide approach would be necessary to accurately map the floodplain,

including in-depth hydraulic analysis of the culvert that crosses from the US into Mexico.

127. Provide the culvert capacity at the international border (Spring Canyon) and Enright Drive (Moody Canyon) and compare the capacity to the post-project flows (onsite plus offsite runoff). Include inlet control calculations when determining culvert capacities. (New Issue)

The capacity of the storm drain within Enright Drive has been determined and has been included in Appendix E of the report titled, "Drainage Study for Southwest Village Vesting Tentative Map (VTM)" dated December 15, 2022. The capacity of the culvert at the international border (Spring Canyon) has not been provided per the 11/9/2022 meeting.

128. Describe the approach for sizing energy dissipation facilities at each storm drain outfall for 100-year flows and velocities from the proposed Specific Plan area. (New Issue)

Outfalls from the VTM area Basin 100 and Basin 200 will be directed through an SDD-105 and Basin 300 will be directed down Beyer Road to a biofiltration basin located adjacent to Beyer Park. Additional analysis for other project areas will be considered as those pads are developed in the Specific Plan area and additional analysis will be performed in final engineering for each of the VTM outfalls.

129. Comment on any channel protection measures needed downstream of the storm drain outfalls (in smaller canyons between the storm drain outfall and the main canyons, in the receiving waters, etc.) (New Issue)

Flowrates from the project site will be mitigated in the proposed project condition and no adverse impacts to the downstream receive channel are anticipated.

DRAINAGE STUDY
FOR
SOUTH OTAY MESA VESTING TENTATIVE MAP

REVISION PAGE
July 15, 2022

This Drainage Study presents a revision to the report titled, "Drainage Study for South Otay Mesa Vesting Tentative Map," dated July 16th, 2021 pursuant changes to the site layout. Notably, outfalls discharging to the San Ysidro landslide complex to the west of the project site have been removed, requiring the approach for drainage and water quality to be adjusted and the site layout to be redesigned. The drainage map for the post-project condition has been revised to reflect the most recent changes. Please find this exhibit in Map Pocket 2.

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REVISION PAGE
July 16, 2020

This Drainage Study presents a revision to the report titled, "Drainage Study for South Otay Mesa Vesting Tentative Map," dated October 25th, 2019 pursuant changes to the site layout. The changes include shifting the highpoint between Basin 300 and Basin 400 to the West of the cul-de-sac on Street A, now the eastern half of Street A is directed down Beyer Boulevard. Revisions have also been made to the layout of the multi-family housing units on the southeastern corner of Basin 200 adjacent to Caliente Ave, shifting the major basin boundary slightly to the west. Finally, the location of the wildlife crossing has shifted east and the proposed culvert on the western half of Beyer Boulevard will be designed to convey offsite tributary flows. The drainage map for the post-project condition has been revised to reflect the most recent changes. Please find this exhibit in Map Pocket 2.

DRAINAGE STUDY
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SOUTH OTAY MESA VESTING TENTATIVE MAP

REVISION PAGE
October 25, 2019

This Drainage Study presents a revision to the report titled, "Drainage Study for South Otay Mesa Vesting Tentative Map," dated March 29th, 2019 pursuant to plan check review comments received from the City of San Diego (LDR-Engineering Review Cycle 4) on May 7th, 2019. The following text identifies the comments along with response from Rick Engineering Company in bold. The site map for the post-project condition has also been revised to reflect the most recent changes to the site layout. Please find this exhibit in Map Pocket 2.

28. Add a discussion to the Drainage Study stating if the proposed project is required to obtain approval from the Regional Water Quality Control Board Under Federal Clean Water Act (CWA) section 401 or 404. A complete explanation must be provided. Please note, if the proposed project is subject to regulations as set forth in CWA 401/404, approval from the California Regional Water Quality Control Board must be obtained prior to permit issuance (New Issue)

    A qualitative discussion pertaining to the 401/404 requirements has been included in the Drainage Study. See section 1.6.

1.0 INTRODUCTION

1.1 Project Description

This drainage study presents hydrologic and hydraulic analyses for the proposed Southwest Village Vesting Tentative Map project (herein referred to as "the project") in support of preliminary engineering. The project is bounded by Interstate 805 to the west, State Route (SR) 905 to the north, and the international border with Mexico to the south. See Figure 1, Vicinity Map, located at the end of Section 1.0.

Overview

The project is proposed to develop a currently bare mesa in the South Otay Valley into a housing development. This would be accomplished through the construction of six (6) different planning areas of varying densities along with accompanying access roads, utilities, and storm drain.

San Ysidro Landslide Complex Considerations

Following conventional drainage design, pre-project drainage basins were delineated, and the proposed project grading was coordinated to ensure that the area of the post-project drainage basins matched that of the pre-project areas. Outfall locations were carefully selected at points of concentration around the project site where the existing topography narrows to form existing channels. However, concerns were raised about the stability of the San Ysidro landslide complex that borders the southwest margin of VTM-1 and the potential impact to this from an increase in stormwater volume from the proposed project site.

To understand this further, Geocon performed geotechnical investigations that penetrated the landslide in three locations. Based on this information, two cross-sections were developed for use in geologic characterization and the performance of slope stability analysis. With supplementary reports from both Rick Engineering ("Landslide Hydrology Analysis for Southwest Village," dated April 16, 2021) and a Groundwater consultant from Dudek ("Initial Assessment of Groundwater Conditions at the Southwest Village Site, Otay Mesa and Surrounding Areas, San Diego County," dated June 14, 2021), Geocon prepared a report titled, "Supplemental Geotechnical Investigation

and Slope Stability Analysis: Southwest Village VTM-1 San Diego, California," dated June 25, 2021. In Section 5 of the report, Geocon concludes,

5.11 Several storm water outfall locations were contemplated during the original project design. These features were proposed to discharge storm runoff collected from the project into pronounced drainages within the landslide complex. Although the infiltration data collected from the discharge locations supported a short-term discharge without adverse effects, the potential for scour and injection of storm water into the slide mass during extreme storm events resulted in a requirement to redesign the storm drain system to discharge outside landslide areas.

Per the conclusions of this report, the drainage area that discharged to the west in the existing condition has now been diverted away from the San Ysidro landslide complex in the proposed condition and the outfalls have been relocated. Refer to Map Pocket 2 that will show the proposed outfall locations and site plan.

City of San Diego Meeting – January 2022

A meeting with the City of San Diego on January 28, 2022 was called to discuss possible alternatives to address the drainage complications due to the landslide complex. A key discussion point in the meeting was whether On-Site flows from Basin 300 would be allowed to Co-mingle with public runoff. After discussion, the City, Rick Engineering, and Tri-Pointe Homes agreed that this was the most acceptable alternative. Primarily, the question that was discussed was how the public/private flows will interact for low flow and high flows events and how the interactions between BMP 3, Beyer Blvd. storm drain, and Beyer Park Biofiltration Basin would work together. Please see the meeting minutes in Appendix H for more details.

Low Flow Events are understood to correspond to water quality storm events, i.e. where 24-hr runoff volume does not exceed the 85% storm rainfall. For these events runoff from basin 300 collects in a large vault, BMP 3, and is filtered through parallel Modular Wetland Units. The outflow from the Modular Wetlands Units is limited to 0.5 times the pre-development Q2 of the Basins Pre-Development area. While BMP 3 is filling and discharging through its low flow orifice at up to 1.25cfs, runoff from Beyer Blvd, Street A, and West Avenue begin to fill the Biofiltration Basin 14 (Beyer Basin). BMP 14 has been sized Volume Based. To ensure that low flow discharge from BMP 3 does not displace volume that is intended to be used from direct runoff from Basin

1400, the low flow release rate of the Beyer Basin is 2.03 CFS or 0.78CFS higher than that of the upstream BMP. Even when BMP 3 is discharging at peak flow rate Beyer Basin will still be able to draw down. Ultimately, water from BMP 3 will be double treated. Full treatment of water quality runoff from Basin 1400 is expected with this configuration.

Mid to High-level storm events, ~Q2 to Q100, will fill the BMPs beyond the water quality ponding depths and activate upper outlets. Both basins have been designed to provide Hydromodification and 100-Year detention. As BMP 14 lies below BMP 3, the outlet works need to be upsized to pass through mitigated flows from the upstream BMP. Modeling has been done that shows compliance for HMP and detention at the project's point of connection, POC M.C. Refer to Attachment 2 the report titled, "Priority Development Project Stormwater Quality Management Plan for Southwest Village," dated March 17th, 2022 (and any revisions thereafter) for HMP SWMM modeling and Attachment F of this Drainage Study for detention routing calculation. The storm drain along Beyer Blvd. has been sized based on detained 100-year flow rates out of BMP 3.

1.2 Drainage Characteristics and Hydromodification Management Criteria

Existing Drainage Characteristics

The existing area is composed of flat mesa tops and finger canyons that drain to the west through Moody Canyon or small natural channels. This is pervious area that historically would have been used for agriculture and farming starting in the 1960s. The existing area within the project boundaries is defined by six (6) major drainage basins, Basin 100, Basin 200, Basin 300, Basin 400, Basin 500, and the Beyer Boulevard drainage basin (Basin 1400). Basin 100 encompasses the most northern portion of the project site and drains in a south westerly direction through a finger canyon towards Moody Canyon Creek where it confluences with other offsite flows (defined in Basin 1400). Basin 200 encompasses the eastern edge of the project site and drains in a westerly direction into Moody Canyon Creek where it confluences with flows from Basin 300 before entering the main channel. Basin 300 includes the western portions of the project site and drains in a northerly direction towards Moody Canyon Creek. Basin 400 and Basin 500 make up the southern and western portion of the project site and drains in a westerly direction through natural channels and eventually into basins on the eastern edge of the railroad tracks. The Beyer Boulevard drainage basin (Basin 1400) is made up of offsite flows on the northwestern extents of the project site and

drains to the west, where flows from Basin 100, 200, 300, and 1400 are collected from Moody Canyon Creek by an existing 54-inch storm drain system on Enright Drive. The existing storm drain system along Enright Drive eventually outlets to the Tijuana River, which extends all the way to the Pacific Ocean within the vicinity of Imperial Beach. Refer to Map Pocket 1 for a summary of the pre-project drainage areas.

During the January 28, 2022 meeting, the capacity of the downstream existing 54-inch RCP on Beyer Blvd. was raised. As part of this project, the capacity of the pipe in question has been studied with AES Pipeflow from approximately 300 feet west of Delany Dr. to the project's point of connection. The analysis suggests that this pipe has capacity to convey 100-year peak flows in the existing condition. The project proposes to match existing flow rates using detention basins. The pipe would then similarly have capacity in the proposed condition. See Appendix A for Pre-Project Hydrology, Appendix B for Post-Project Hydrology, Appendix E for Hydraulic Analysis including a mark-up of As-Built Plans, and Appendix F for Detention routing calculations.

Proposed Drainage Characteristics

In the post-project condition, the drainage characteristics for Basin 100 and 200 will remain similar as compared to the pre-project conditions. However, due to the proximity of the San Ysidro Landslide complex, the geotechnical engineer and the ground water consultant have recommended that no drainage be directed to the landslide area. Therefore, Basin 400 and approximately half of Basin 500, which previously drained through natural channels to the west, have been incorporated into Basin 300 and directed to the north in the post-project condition. Additional detail for each drainage basin is provided below. It is currently anticipated that the project will result in an overall increase to impervious surfaces. As a result, the project as a whole will result in an increase in storm water runoff. A detention analysis will be provided to address this increase in runoff for the 100-year storm event. At this preliminary stage, it is not anticipated that the project will adversely impact the hydraulics of the existing 54-inch storm drain located downstream of the project. Refer to Appendix E for calculations. Furthermore, Low Impact Development (LID) Best Management Practices (BMPs) will be utilized to collect, retain, treat, and discharge runoff contributing further to reducing the impact of increases in runoff. Drainage characteristics for each of the major drainage basins are described below.

Drainage Basin 100

Drainage Basin 100 will include on-site flood control conveyance for the 100-year storm event. On-site storm conveyance systems will be used to collect runoff from the existing portions of the project and from the proposed on-site development area. A network of storm drains, open channels, water quality (WQ), and Hydromodification Management Plan (HMP) features will be used to collect, convey, and manage storm water runoff throughout the development area prior to discharging into Moody Canyon Creek. Proposed landscaped hillsides along the edges of the planning area are considered self-mitigating areas and will bypass the proposed water quality feature because they are not required to be treated. The tributary area to the existing outfall location would remain similar to its current drainage patterns.

Drainage Basin 200

The drainage basin will include on-site flood control conveyance for the 100-year storm event. On-site storm conveyance systems will be used to collect runoff from the existing portions of the project and from the proposed on-site development area. A network of storm drains and open channels will be used to convey storm water runoff to the proposed proprietary biofiltration BMP and HMP detention vault prior to discharging into Moody Canyon Creek. Proposed landscaped hillsides along the edges of the planning area are considered self-mitigating areas and will bypass the proposed water quality feature because they are not required to be treated. The tributary area to the existing outfall would remain similar to its current drainage patterns.

Drainage Basin 300

Due to the presence of the San Ysidro Landslide area, Drainage Basin 300 will incorporate drainage basins that were originally directed to the west in the pre-project conditions. This includes Basin 400 and approximately the northern half of Basin 500 (the southern half will be directed to Spring Canyon in the ultimate condition). Outflows from Basin 300 will discharge into the proposed backbone storm drain along Beyer Blvd. While atypical, the mingling of clean and untreated flows was deemed to be the best option considering difficulties maintaining a very inaccessible storm drain outfall in Moody Canyon and the environmental impacts resulting from its construction.

Meetings with the City of San Diego Department of Development services have supported this approach.

Basin 300 will also include on-site flood control conveyance for the 100-year storm event. On-site storm conveyance systems will be used to collect runoff from the existing portions of the project and from the proposed on-site development area. A network of storm drains, open channels, water quality (WQ), and Hydromodification Management Plan (HMP) features will be used to collect, convey, and manage storm water runoff throughout the development area. Proposed landscaped hillsides along the edges of the planning area are considered self-mitigating areas that will bypass the proposed water quality feature because they are not required to be treated.

Beyer Boulevard Drainage Basin (Basin 1400)

This large drainage basin makes up much of the Moody Canyon watershed and at the downstream point of interest (POI) it has confluence with the three other post-project basins proposed within the site (Basin 100, 200, and 300). Basin 1400 will include on-site flood control conveyance for the 100-year storm event. On-site storm conveyance systems will be used to collect runoff from the existing portions of the project and from the proposed on-site development area. A network of storm drains, water quality (WQ), and Hydromodification Management Plan (HMP) features will be used to collect, convey, and manage storm water runoff throughout the roadway prior to discharging into the existing 54-inch storm drain system on Enright Drive. The tributary area to the existing outfall has increased in the post-project as compared to the pre-project to mitigate for the presence of the landslide complex. However, despite the increase in area, post-project flows will be mitigated back to pre-project levels.

One wildlife overpass and several smaller critter-crossings are proposed through the alignment of Beyer Blvd. The area tributary to these crossings has been minimized and brow ditches have been designed to limit the flow of stormwater into these facilities. The culvert downstream will be designed to convey off site tributary flows from Moody Canyon.

1.3 Hydrology and Hydraulics

Hydrology and hydraulics are discussed in detail in Sections 2.0 and 3.0 of this report.

1.4 Water Quality

Post-project storm water runoff will be treated per the City of San Diego's Storm Water Standards, dated May 2021, and will be discussed in the report titled, "Priority Development Project Storm Water Quality Management Plan (PDP SWQMP) for Southwest Village (Preliminary Engineering)," dated December 16, 2022, and any revisions thereafter, prepared by Rick Engineering Company (Job No. 15013-C). Hydromodification management plan (HMP) requirements are also addressed within the Priority Development Project Storm Water Quality Management Plan (PDP SWQMP) for the project.

1.5 Hydromodification Management Requirements

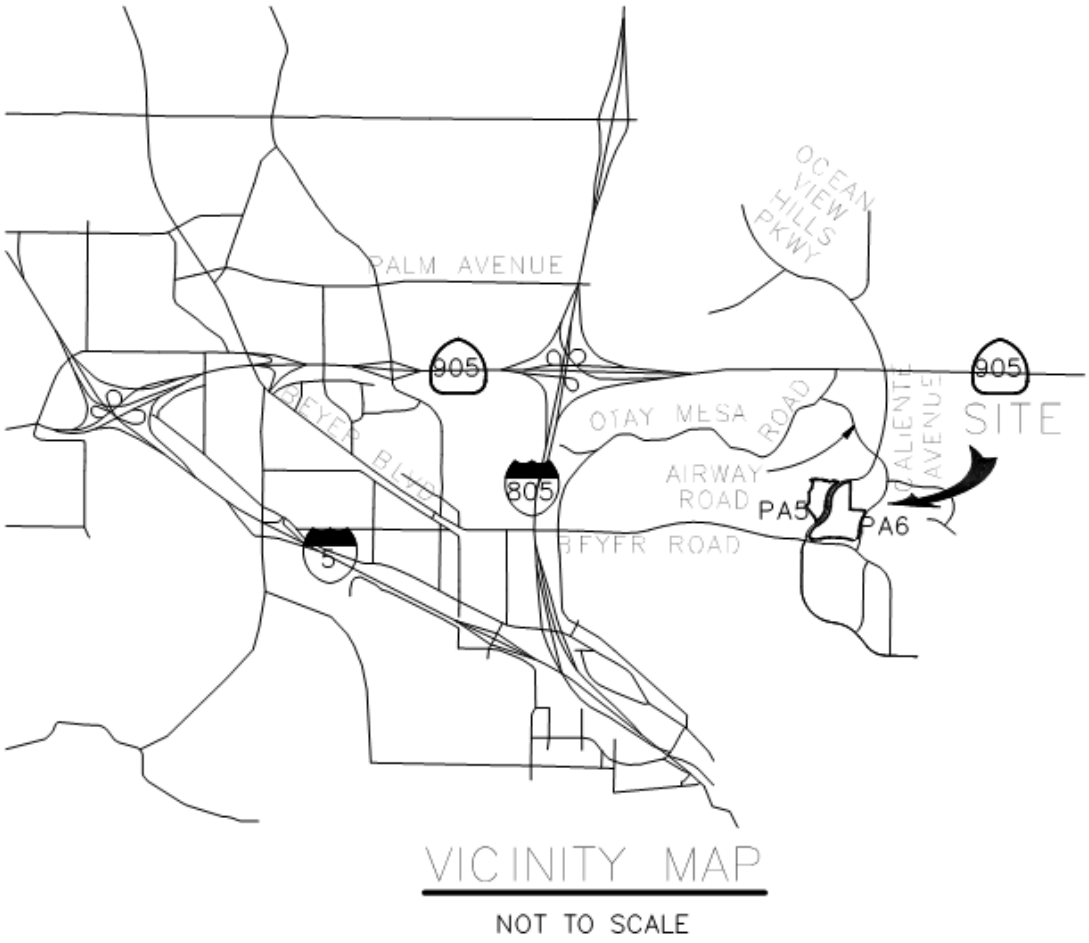
According to the Storm Water Standards, Priority Development Projects must be designed so that runoff rates and durations are controlled to pre-development rates in order to reduce downstream erosion conditions and protect stream habitat. In order to comply with the Storm Water Standards, a hydromodification management plan is discussed within the PDP SWQMP for the project.

1.6 Clean Water Act and FEMA

This project is impacting jurisdictional waters and is subject to the 401/404 permit per the delineations of the Waters of the State provided by RECON Environmental.

The footprint of the project was checked against mapped FEMA floodplain, and it was determined that the project area is subjected to minimal flood hazard and given a Zone X designation (Areas determined to be outside the 0.2% annual chance floodplain). Refer to Appendix G for FEMA FIRMette panels.

Figure 1: Vicinity Map



2.0 HYDROLOGY

2.1 Methodology

The City of San Diego Drainage Design Manual, dated January 2017, requires that the Modified Rational Method be used for hydrologic analysis of a watershed up to but not exceeding 1.0 square-mile (640 acres). The Rational Method computer program developed by Advanced Engineering Software (AES 2003) was used for this study because it satisfies the City of San Diego's design criteria.

2.1.1 Modified Rational Method

The AES hydrologic model is developed by creating independent node-link models of each interior drainage basin and linking these sub-models together at confluence points. The program has the capability to perform calculations for 15 hydrologic processes. These processes are assigned code numbers that appear in the results. The code numbers and their significance are as follows:

Code 1: Confluence analysis at a node
Code 2: Initial subarea analysis
Code 3: Pipe flow travel time (computer-estimated pipe sizes)
Code 4: Pipe flow travel time (user-specified pipe size)
Code 5: Trapezoidal channel travel time
Code 6: Street flow analysis through a subarea
Code 7: User-specified information at a node
Code 8: Addition of the subarea runoff to mainline
Code 9: V-Gutter flow thru subarea
Code 10: Copy main-stream data onto a memory bank
Code 11: Confluence a memory bank with the main-stream memory
Code 12: Clear a memory bank
Code 13: Clear the main-stream memory
Code 14: Copy a memory bank onto the main-stream memory
Code 15: Hydrologic data bank storage functions

In order to perform the hydrologic analysis, base information for the study area is required. This information includes the existing drainage facility locations and sizes, existing land uses, flow patterns, drainage basin boundaries, and topographic elevations. Drainage basin boundaries, flow patterns, and topographic elevations are shown on the drainage exhibits located in the map pockets.

2.2 Criteria

The hydrologic conditions were analyzed in accordance with the City of San Diego's design criteria as follows:

Design Storm: 100-year

Runoff Coefficients*:

0% Impervious	C = 0.45
100% Impervious	C = 0.95

Soil Type: D

Rainfall Intensity: Based on time-intensity criteria per City of San Diego

* Weighted runoff coefficients were used where appropriate based on a percentage of 0.95 and 0.45. Refer to Appendix C for supporting materials. For the single-family residential lots, 60% impervious was assumed and for the multi-unit residential lots 70% impervious was assumed. For private and public streets, 90% impervious was assumed.

2.3 Hydrologic Results

Rational Method computer outputs for the pre- and post-project conditions can be found in Appendices A and B, respectively. Watershed boundaries, Rational Method node numbers, flow patterns, and areas can be found on the workmaps titled, “Drainage Study Map for Southwest Village VTM [Pre-project],” and “Drainage Study Map for Southwest Village VTM [Post-project],” located in Map Pockets 1 and 2, respectively. A summary of the hydrologic results for the pre- and post-project conditions at points of interest can be found in Table 2.1 below. Based

on the summary, the post-project condition will maintain similar drainage patterns for Basins 100 and 200, however, due to the landslide complex area is diverted into Basin 300 from Basin 400 and Basin 500. The post-project peak flow rates have also increase in all basins compared to pre-project conditions, due to the large amount of proposed impervious area in the post-project condition. As a result of this increase, the project includes a detention analysis for the 100-year storm event to detain and attenuate post-project runoff rates back to the pre-project condition.

Table 2.1: Summary of Hydrologic Results

Drainage Basin #	Drainage Node # at Point of Interest	Project Condition	Tributary Area, A (acres)	Time of Concentration, T_c (minutes)	100-year Flow Rates, Q_{100} (cfs [1])
100	199	Pre-project	17.2	15.3	22.3
		Post-project	16.5	12.9	29.8
200	299	Pre-project	61.0	15.9	77.7
		Post-project[2]	60.7	11.5	99.7
300	399	Pre-project	27.6	15.0	36.1
	398	Post-Project	32.3	10.9	90.2
	399	Post-project	7.2	10.3	19.8
400A	410	Pre-project	5.4	12.9	7.3
		Post-project[3]	0.0	-	-
400B	420	Pre-project	1.9	14.7	2.5
		Post-project[3]	0.0	-	-
500	550	Pre-project	14.3	16.3	18.0
		Post-project[3]	0.0	-	-
1400	1499	Pre-Project[4]	319.9	24.2	337
	1499	Post-Project[4]	346.1	22.9	429

Notes:

1. "cfs" = cubic feet per second
2. This rational method calculation uses a C value of 0.45 for offsite drainage areas tributary to Node 285. However, the storm drain downstream of Node 285 has been sized considering the ultimate condition. It is anticipated that when these areas are developed, they will include a detention analysis in order to route post-project flows back to pre-project conditions.
3. Post project are that drains to the landslide complex is diverted to Moody Canyon to the north. Basin 500 drains both to Moody Canyon and Spring Canyon in the ultimate developed condition.
4. The area tributary to Point of Interest Node 1499, in both the pre- and post-project condition, include the area from Basin 100, 200, and 300. The contributing Q100 from Basin 100, 200, and 300 in the post-project condition is calculated with the detained Q100.

3.0 HYDRAULICS

3.1 Hydraulic Methodology and Criteria

The 100-year post-project peak flow rates determined using the Modified Rational Method was used to size the on-site storm drain system. In addition, hydraulic analyses regarding preliminary inlet sizing calculations are included.

3.1.1 Storm Drain Sizing

Storm drainpipe sizes were determined based on a normal depth calculation to verify storm drain capacity based on Manning's equation.

$$Q = (1.486/n)\, A\, R^{2/3}\, S^{1/2}$$

Where:

Q = Discharge (cfs)

n = Manning's roughness coefficient

A = Cross-sectional Area of flow (sq. ft.)

R = Hydraulic radius (ft.) (where hydraulic radius is defined as the cross-section area of flow divide by the wetted perimeter, R= A/P)

S = Slope of pipe (ft./ft.)

The Manning's roughness coefficient "n" of 0.013 was used for the hydraulic calculations. This value is typically used for reinforced concrete pipe (RCP), polyvinyl chloride (PVC) and high-density polyethylene pipe (HDPE). The pipe sizes were evaluated based on the Rational Method flow rates with a 30% "bump up" sizing factor to account for hydraulic losses within the system.

Please refer to Appendix E for the preliminary storm drain sizes. The AES rational method results located in Appendix B of this report may be referenced for further information concerning pipe flow.

3.1.2 Inlet Design

Inlet design calculations were completed using a computer program based on the following equations for inlets on a grade and inlets in a sump:

Type B Inlets on a Grade

$$Q = 0.7\ L\ (a + y)^{3/2}$$

Where: y = depth of flow approaching the curb inlet, in feet (ft)

a = depth of depression of curb at inlet, in feet (ft)

L = length of clear opening of inlet for total interception, in feet (ft)

Q = interception capacity of the curb inlet, in cubic feet per second (cfs)

Type B Inlets in a Sump

$$Q/L = 1.5\ cfs/ft$$

Where: Q = inlet capacity, in cubic feet per second (cfs)

L = length of clear opening of inlet for total interception, in feet (ft)

Inlet Results

Inlet locations have been identified for all of the basins within that comprise this project. Inlets have been sized for the 100-year, 6-hour storm event. Each inlet has been sized to provide 100% capture of the flow draining to the inlet, except where bypass flow occurs, a downstream inlet will be sized to capture the bypass flow. The inlet design calculations along with back up information has been presented in Appendix D. Refer to the drainage study map provided in Map Pocket 2 for the location of each inlet.

3.2 Moody Canyon Hydraulics

Hydraulic analyses for Moody Canyon were performed using flow rate, slope, and Manning's n data from the Modified Rational Method, and cross-sectional geometry was extracted from the topography of the Post Drainage Exhibit. This data was inputted and processed through the Hydraulic Toolbox v4.4, developed by the FHWA, which then produced an approximate water surface elevation. At the downstream entrance to the proposed culvert under Beyer Road inlet

control calculations were performed to determine the head required to pass the 100-year flow rather through the proposed 54-inch pipe. Using this elevation and the water surface elevations determined from the normal depth calculations at each cross-section, an approximate floodplain for Moody Canyon has been drawn onto the Post-Project Drainage Map located in Map Pocket 2. Please also refer to Appendix I for additional backup.

4.0 DETENTION ANALYSES

For the design of detention facilities, the modified rational method hydrologic analysis was performed to determine the 100-year flow rates for both the pre-project condition and the post-project condition. Pre-project and post-project rational method output for the project is provided in Appendices A and B of this report.

4.1 Hydrograph Development

The sizing of a detention facility requires an inflow hydrograph to obtain the necessary storage volume. The modified rational method only yields a peak discharge and time of concentration and does not yield a hydrograph. In order to convert the peak discharge and time of concentration into a hydrograph, Rick Engineering's program, RatHydro was used. RatHydro generates a hydrograph from the following inputs: Time of concentration, 6-Hour Precipitation depth, basin area, rational method runoff coefficient, and peak discharge rate. The generated hydrograph can then be used as the inflow hydrograph for basin sizing within HEC-1.

4.3 HEC-1 Methodology and Criteria

100-year hydrographs and preliminary elevation-storage-outflow rating curves were used in the HEC-1 hydrologic model to perform routing calculations for the detention basin, and to determine the preliminary 100-year detention volumes required for the basin to reduce the post-project peak discharge rate back to the pre-project peak discharge rate. Actual storage and rating curves will be provided during final engineering along with detailed outlet-works designs for each BMP.

4.4 Detention Results

The 100-year, 6-hour post-project peak discharge rates were routed using the HEC-1 hydrologic model to determine the detention volume required for the vaults to reduce post-project peak discharge rates back to the pre-project peak discharge rates for select storm events. The HEC-1 detention analyses computer output is located in Appendix F of this report.

The proposed detention vaults are designed to include volumes to comply with hydromodification management criteria, in addition to directing water quality volumes towards proposed downstream Modular Wetlands units. Detention volume sizing is provided within the proposed StormTrap vaults. These vaults are designed to route the post-project peak discharge rate back to pre-project conditions at the project's POCs. In order to account for offsite drainage areas that are not being routed through the vaults, detention was analyzed at the vaults themselves rather than at the project's POCs. Post-Project detained hydrologic analyses that reflect detention occurring upstream from the project's POCs is included in Appendix B following the un-detained analyses. Refer to Map Pocket 2 of this report for an exhibit of vault locations and POC locations. Table 4.1 will provide a summary of the detention analysis.

Table 4.1 Detention Analysis Summary

BMP ID	NODE #	Pre-Project Q_{100} (cfs)	Post-Project Q_{100} (Un-Detained) (cfs)	Post-Project Q_{100} (Detained) (cfs)
BMP 1	180	21.3	29.8	18.4
BMP 2	290	76.1	99.7[1]	72.5[1]
BMP 14	1499	337	429	336

Note:

1. The post-project Q_{100} and post-project detained Q_{100} were calculated using a C value of 0.45 for offsite drainage areas that are tributary to POC 2 but are not being routed through the proposed detention vault.

5.0 CONCLUSION

This drainage study presents the hydrologic and hydraulic analyses for the Southwest Village VTM project in support of preliminary engineering. The pre-project and post-project condition peak discharge rates were determined using the Modified Rational Method based on the hydrologic methodology and criteria described in the City of San Diego Drainage Design Manual, January 2017.

The overall drainage characteristics in the post-project condition will remain similar as compared to the pre-project conditions for Basin 100 and 200, however, due to the proximity of the San Ysidro landslide complex, drainage has been diverted away from this area and either north to the proposed storm drain down Beyer Blvd. or south to Spring Canyon. It is currently anticipated that the project will result in an overall increase to impervious surfaces. As a result, the project as a whole will result in an increase in storm water runoff. Preliminary detention sizing is provided for the 100-year, 6-hour storm event so that post-project peak discharge rates are routed back to pre-project conditions using the HEC-1 hydrologic model. At this stage, it is not anticipated that the project will adversely impact the hydraulics of existing drainage systems located downstream of the project. The project will also include LID BMPs and Pollutant Control BMPs that will further reduce/slow runoff for post-project conditions.

The 100-year, 6-hour post-project peak flow rates were utilized to size the proposed drainage system, including preliminary sizing for proposed storm drain and inlets. Inlet locations have been identified and the detailed inlet sizing will be provided during final engineering. Riprap pad locations have been identified and their preliminary sizing has been provided schematically to help reduce velocities and minimize erosion. Please see the post-project Drainage Study Exhibit in Map Pocket 2. Riprap design calculations will be provided during final engineering.

Post-project runoff will be managed per the City of San Diego Storm Water Standards Manual, May 2021. Please refer to the report titled, “Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP) for Southwest Village VTM” dated December 16, 2022 (or any revision thereafter), prepared by Rick Engineering Company (Job No. 15013-C), for more information on water quality and HMP.

APPENDIX A

Modified Rational Method Output
[Pre-project]

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2003 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                             Analysis prepared by:

                           RICK ENGINEERING COMPANY
                               5620 Friars Road
                          San Diego, California 92110
                        619-291-0707   Fax 619-291-4165

 ************************ DESCRIPTION OF STUDY *************************
* J-15013C SOUTH OTAY                                                  *
* 100-YEAR, 6-HOUR STORM EVENT                                         *
* BASIN 400A EXISTING CONDITION                                        *
 ************************************************************************

  FILE NAME: SOB400AE.RAT
  TIME/DATE OF STUDY: 16:42 01/25/2018
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   112.00
  UPSTREAM ELEVATION(FEET) =    502.00
  DOWNSTREAM ELEVATION(FEET) =    500.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.206
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    478.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   507.00   CHANNEL SLOPE =  0.0434
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.127
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.10
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   2.73
  Tc(MIN.) =  12.93
  SUBAREA AREA(ACRES) =     4.30       SUBAREA RUNOFF(CFS) =    6.05
  TOTAL AREA(ACRES) =      4.50         PEAK FLOW RATE(CFS) =       6.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   3.88
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    410.00 =   619.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.127
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    1.27
  TOTAL AREA(ACRES) =      5.40   TOTAL RUNOFF(CFS) =    7.63
  TC(MIN.) =  12.93
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      5.40  TC(MIN.) =     12.93
```

```
  PEAK FLOW RATE(CFS)   =      7.63
================================================================================
================================================================================
  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 1982-2003 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                 5620 Friars Road
                            San Diego, California 92110
                           619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* J-15013C SOUTH OTAY                                                    *
* 100-YEAR, 6-HOUR STORM EVENT                                           *
* BASIN 400B EXISTING CONDITION                                          *
 **************************************************************************

  FILE NAME: SOB400BE.RAT
  TIME/DATE OF STUDY: 16:47 01/25/2018
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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    400.00 TO NODE    402.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   107.00
  UPSTREAM ELEVATION(FEET) =    502.00
  DOWNSTREAM ELEVATION(FEET) =    501.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   12.379
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.188
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
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============================================================================
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  CHANNEL LENGTH THRU SUBAREA(FEET) =   319.00   CHANNEL SLOPE =  0.0408
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.936
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.32
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   2.29
  Tc(MIN.) =  14.67
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    2.38
  TOTAL AREA(ACRES) =      1.90         PEAK FLOW RATE(CFS) =       2.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.81
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    420.00 =   426.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      1.90  TC(MIN.) =     14.67
  PEAK FLOW RATE(CFS)   =      2.52
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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                             Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                           San Diego, California 92110
                         619-291-0707   Fax 619-291-4165

 ************************ DESCRIPTION OF STUDY *************************
* J-15013C SOUTH OTAY                                                  *
* 100-YEAR, 6-HOUR STORM EVENT                                         *
* BASIN 500 EXISTING CONDITION                                         *
 ************************************************************************

  FILE NAME: SS05HE00.RAT
  TIME/DATE OF STUDY: 08:26 02/13/2018
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   118.00
  UPSTREAM ELEVATION(FEET) =    499.00
  DOWNSTREAM ELEVATION(FEET) =    498.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   13.430
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.073
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    550.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.00  DOWNSTREAM(FEET) =    475.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   688.00   CHANNEL SLOPE =  0.0334
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.793
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  87
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      9.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.94
  AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   2.91
  Tc(MIN.) =  16.34
  SUBAREA AREA(ACRES) =    14.00       SUBAREA RUNOFF(CFS) =   17.59
  TOTAL AREA(ACRES) =     14.30         PEAK FLOW RATE(CFS) =      18.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   4.71
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    510.00 =   806.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     14.30  TC(MIN.) =     16.34
  PEAK FLOW RATE(CFS)   =     18.01
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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              Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                           San Diego, California 92110
                         619-291-0707   Fax 619-291-4165

 ************************ DESCRIPTION OF STUDY *************************
* J-15013C SOUTHWEST VILLAGE                                           *
* 100-YEAR, 6-HOUR STORM EVENT                                         *
* BASIN 1400 - BEYER BLVD PRE-PROJECT                                  *
 **********************************************************************

  FILE NAME: S1014E00.RAT
  TIME/DATE OF STUDY: 12:46 02/17/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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   1400.00 TO NODE   1401.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE   1401.00 TO NODE   1402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   83.00
  STREET LENGTH(FEET) =   850.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   15.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   4.15   Tc(MIN.) =    9.15
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.611
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   33.11
  TOTAL AREA(ACRES) =       13.4        PEAK FLOW RATE(CFS) =      33.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  20.52
  FLOW VELOCITY(FEET/SEC.) =  4.03   DEPTH*VELOCITY(FT*FT/SEC.) =   2.06
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  850.0 FT WITH ELEVATION-DROP =  17.0 FT, IS   39.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE   1402.00
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1402.00 =     850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1402.00 TO NODE   1404.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     43.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      47.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.49
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   2.44
  Tc(MIN.) =   11.59
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   27.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.576
  TOTAL AREA(ACRES) =       30.7          PEAK FLOW RATE(CFS) =      57.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   6.93
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1404.00 =    1800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1404.00 TO NODE   1404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6085
  SUBAREA AREA(ACRES) =    5.20   SUBAREA RUNOFF(CFS) =   13.62
  TOTAL AREA(ACRES) =       35.9   TOTAL RUNOFF(CFS) =      71.54
  TC(MIN.) =   11.59

****************************************************************************
  FLOW PROCESS FROM NODE   1404.00 TO NODE   1405.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     43.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1415.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.896
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      87.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.82
  AVERAGE FLOW DEPTH(FEET) =   0.93   TRAVEL TIME(MIN.) =   3.46
  Tc(MIN.) =   15.05
  SUBAREA AREA(ACRES) =    24.40       SUBAREA RUNOFF(CFS) =   31.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.544
```

```
  TOTAL AREA(ACRES) =       60.3         PEAK FLOW RATE(CFS) =      95.06

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   7.03
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1405.00 =    3215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1405.00 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.) =   15.05
  RAINFALL INTENSITY(INCH/HR) =   2.90
  TOTAL STREAM AREA(ACRES) =    60.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     95.06

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     76.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.203
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.71
  AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   3.69
  Tc(MIN.) =   12.25
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    8.65
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        6.3         PEAK FLOW RATE(CFS) =       9.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   3.28
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     92.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.091
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.28
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   1.02
  Tc(MIN.) =   13.27
  SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    0.97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        7.0         PEAK FLOW RATE(CFS) =       9.74

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   3.33
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =     900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.091
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =    3.50   SUBAREA RUNOFF(CFS) =    4.87
  TOTAL AREA(ACRES) =       10.5   TOTAL RUNOFF(CFS) =      14.60
  TC(MIN.) =   13.27

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    199.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     80.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   500.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.878
```

```
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.15
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =   15.27
  SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =    8.68
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       17.2         PEAK FLOW RATE(CFS) =      22.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.43   FLOW VELOCITY(FEET/SEC.) =   4.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    199.00 =    1400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE   1405.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     72.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.691
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.99
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   2.34
  Tc(MIN.) =   17.61
  SUBAREA AREA(ACRES) =    17.00       SUBAREA RUNOFF(CFS) =   20.59
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       34.2         PEAK FLOW RATE(CFS) =      41.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   5.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE   1405.00 =    2100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1405.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.61
  RAINFALL INTENSITY(INCH/HR) =   2.69
  TOTAL STREAM AREA(ACRES) =    34.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     41.42

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       95.06    15.05        2.896         60.30
```

This is Peak flow Rate at POC 1

```
     2       41.42    17.61        2.691         34.20

  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      130.46    15.05       2.896
      2      129.77    17.61       2.691

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     130.46   Tc(MIN.) =   15.05
  TOTAL AREA(ACRES) =       94.5
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1405.00 =    3215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     84.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.827
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     133.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.77
  AVERAGE FLOW DEPTH(FEET) =   1.17   TRAVEL TIME(MIN.) =   0.86
  Tc(MIN.) =   15.91
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    6.49
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.507
  TOTAL AREA(ACRES) =       99.6         PEAK FLOW RATE(CFS) =     142.81

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.22   FLOW VELOCITY(FEET/SEC.) =   7.90
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1410.00 =    3615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1410.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
```

```
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     52.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.187
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.48
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   3.83
  Tc(MIN.) =   12.39
  SUBAREA AREA(ACRES) =     9.20       SUBAREA RUNOFF(CFS) =   13.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        9.4         PEAK FLOW RATE(CFS) =      13.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   4.20
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     88.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.039
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.73
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   1.34
  Tc(MIN.) =   13.73
  SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    0.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =      13.81
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   3.76
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =    1200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.039
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =   26.30   SUBAREA RUNOFF(CFS) =   35.97
  TOTAL AREA(ACRES) =       36.4   TOTAL RUNOFF(CFS) =      49.78
  TC(MIN.) =   13.73

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    230.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     86.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.930
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      53.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.88
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.99
  Tc(MIN.) =   14.73
  SUBAREA AREA(ACRES) =     5.30       SUBAREA RUNOFF(CFS) =    6.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       41.7         PEAK FLOW RATE(CFS) =      54.98

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   5.93
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.930
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =   14.70   SUBAREA RUNOFF(CFS) =   19.38
  TOTAL AREA(ACRES) =       56.4   TOTAL RUNOFF(CFS) =      74.36
  TC(MIN.) =   14.73
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    299.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     82.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.830
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      77.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.57
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   1.14
  Tc(MIN.) =   15.87
  SUBAREA AREA(ACRES) =     4.60       SUBAREA RUNOFF(CFS) =    5.86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       61.0         PEAK FLOW RATE(CFS) =      77.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.87   FLOW VELOCITY(FEET/SEC.) =   6.60
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    299.00 =    2000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE   1408.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     82.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.741
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      81.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.70
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   1.12
  Tc(MIN.) =   16.99
  SUBAREA AREA(ACRES) =     6.20       SUBAREA RUNOFF(CFS) =    7.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       67.2         PEAK FLOW RATE(CFS) =      82.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =   6.72
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE   1408.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1408.00 TO NODE   1408.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

This is Peak flow Rate at POC 2

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.99
  RAINFALL INTENSITY(INCH/HR) =   2.74
  TOTAL STREAM AREA(ACRES) =    67.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     82.89

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     76.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.230
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.91
  AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   3.44
  Tc(MIN.) =   12.00
  SUBAREA AREA(ACRES) =     7.90       SUBAREA RUNOFF(CFS) =   11.48
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      11.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   3.54
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     86.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.052
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.62
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   1.61
  Tc(MIN.) =   13.62
  SUBAREA AREA(ACRES) =     1.20       SUBAREA RUNOFF(CFS) =    1.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        9.3         PEAK FLOW RATE(CFS) =      12.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   3.67
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    320.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    320.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.052
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =    9.90   SUBAREA RUNOFF(CFS) =   13.60
  TOTAL AREA(ACRES) =       19.2   TOTAL RUNOFF(CFS) =      26.37
  TC(MIN.) =   13.62

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    399.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     84.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.903
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.91
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   1.36
  Tc(MIN.) =   14.97
  SUBAREA AREA(ACRES) =     7.00       SUBAREA RUNOFF(CFS) =    9.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       26.2         PEAK FLOW RATE(CFS) =      34.22
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   5.08
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    399.00 =    1450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    399.00 TO NODE    399.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.903
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    1.83
  TOTAL AREA(ACRES) =      27.6   TOTAL RUNOFF(CFS) =     36.05
  TC(MIN.) =   14.97

****************************************************************************
  FLOW PROCESS FROM NODE    399.00 TO NODE   1408.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     90.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.838
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.20
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   0.80
  Tc(MIN.) =   15.78
  SUBAREA AREA(ACRES) =     2.10       SUBAREA RUNOFF(CFS) =    2.68
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       29.7         PEAK FLOW RATE(CFS) =      37.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   5.26
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE   1408.00 =    1700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1408.00 TO NODE   1408.00 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.) =   15.78
  RAINFALL INTENSITY(INCH/HR) =   2.84
  TOTAL STREAM AREA(ACRES) =    29.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     37.93

  ** CONFLUENCE DATA **
```

This is Peak flow Rate from Basin 300

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       82.89    16.99        2.741         67.20
      2       37.93    15.78        2.838         29.70

  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      114.90    15.78       2.838
      2      119.52    16.99       2.741

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     119.52   Tc(MIN.) =   16.99
  TOTAL AREA(ACRES) =       96.9
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE   1408.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1408.00 TO NODE   1410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     78.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   550.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.644
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     123.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.58
  AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   1.21
  Tc(MIN.) =   18.20
  SUBAREA AREA(ACRES) =     6.90       SUBAREA RUNOFF(CFS) =    8.21
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =      103.8         PEAK FLOW RATE(CFS) =     123.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.12   FLOW VELOCITY(FEET/SEC.) =   7.58
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE   1410.00 =    3000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1410.00 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      123.51    18.20       2.644      103.80
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE   1410.00 =    3000.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      142.81    15.91       2.827       99.60
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1410.00 =    3615.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     250.78      15.91        2.827
      2     257.07      18.20        2.644

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     257.07   Tc(MIN.) =   18.20
  TOTAL AREA(ACRES) =      203.4

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1420.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     60.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.504
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     271.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.52
  AVERAGE FLOW DEPTH(FEET) =   1.70   TRAVEL TIME(MIN.) =   1.75
  Tc(MIN.) =   19.95
  SUBAREA AREA(ACRES) =    25.90       SUBAREA RUNOFF(CFS) =   29.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.475
  TOTAL AREA(ACRES) =      229.3         PEAK FLOW RATE(CFS) =     272.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.70   FLOW VELOCITY(FEET/SEC.) =   9.51
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1420.00 =    4615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1420.00 TO NODE   1430.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =      0.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2500.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.252
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     318.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.96
  AVERAGE FLOW DEPTH(FEET) =   1.84   TRAVEL TIME(MIN.) =   4.18
```

```
  Tc(MIN.) =   24.13
  SUBAREA AREA(ACRES) =    90.60       SUBAREA RUNOFF(CFS) =   91.82
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.468
  TOTAL AREA(ACRES) =      319.9         PEAK FLOW RATE(CFS) =     337.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.89   FLOW VELOCITY(FEET/SEC.) =  10.12
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1430.00 =    7115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1430.00 TO NODE   1499.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    92.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.77
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     337.04
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   24.22
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1499.00 =    7265.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      319.9  TC(MIN.) =     24.22
  PEAK FLOW RATE(CFS)   =     337.04
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

This is Peak flow Rate at POC M.C.

APPENDIX B

Modified Rational Method Output
[Post-project Un-detained]

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2003 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                 5620 Friars Road
                            San Diego, California 92110
                          619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* J-15013C SOUTHWEST VILLAGE                                             *
* 100-YEAR, 6-HOUR STORM EVENT                                           *
* BASIN 100 POST-PROJECT                                                 *
 **************************************************************************

  FILE NAME: S101HP00.RAT
  TIME/DATE OF STUDY: 14:52 07/02/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
```

```
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    533.00
  DOWNSTREAM ELEVATION(FEET) =    532.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.206
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.601
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    532.00  DOWNSTREAM(FEET) =    504.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   629.00   CHANNEL SLOPE =  0.0445
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.214
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.56
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   2.94
  Tc(MIN.) =  12.15
  SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =    9.69
  TOTAL AREA(ACRES) =      6.80         PEAK FLOW RATE(CFS) =       9.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   4.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =   704.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    504.00  DOWNSTREAM(FEET) =    478.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   332.00   CHANNEL SLOPE =  0.0783
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.121
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.59
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   0.84
  Tc(MIN.) =  12.99
  SUBAREA AREA(ACRES) =     1.00       SUBAREA RUNOFF(CFS) =    1.40
  TOTAL AREA(ACRES) =      7.80         PEAK FLOW RATE(CFS) =      11.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.35   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =  1036.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    472.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   145.00   CHANNEL SLOPE =  0.0414
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.069
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.08
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   0.48
  Tc(MIN.) =  13.46
  SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =      8.30         PEAK FLOW RATE(CFS) =      11.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.35   FLOW VELOCITY(FEET/SEC.) =   5.09
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =  1181.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    170.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   127.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     11.95
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =  13.79
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    170.00 =  1308.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 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.) =  13.79
  RAINFALL INTENSITY(INCH/HR) =   3.03
  TOTAL STREAM AREA(ACRES) =     8.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.95

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.00
  UPSTREAM ELEVATION(FEET) =    503.00
  DOWNSTREAM ELEVATION(FEET) =    498.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.441
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.126
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.00  DOWNSTREAM(FEET) =    474.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    98.00   CHANNEL SLOPE =  0.2449
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.969
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.97
  AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =   0.83
  Tc(MIN.) =   7.27
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =      0.30         PEAK FLOW RATE(CFS) =       0.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.02   FLOW VELOCITY(FEET/SEC.) =   2.65
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =   191.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    127.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   331.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.51
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      0.54
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   9.46
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =   522.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.552
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.64
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    1.18
  TC(MIN.) =   9.46
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    170.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.27
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.18
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   9.75
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    170.00 =   594.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 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.) =   9.75
  RAINFALL INTENSITY(INCH/HR) =   3.50
  TOTAL STREAM AREA(ACRES) =     0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.18

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    94.00
  UPSTREAM ELEVATION(FEET) =    492.00
  DOWNSTREAM ELEVATION(FEET) =    491.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.564
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    135.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  491.00  DOWNSTREAM ELEVATION(FEET) =  489.50
  STREET LENGTH(FEET) =   341.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    5.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    0.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.20
  STREET FLOW TRAVEL TIME(MIN.) =   6.26   Tc(MIN.) =  12.26
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.202
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.61
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.55
  FLOW VELOCITY(FEET/SEC.) =  0.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.23
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    135.00 =   435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    135.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.202
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    2.78
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =    3.79
  TC(MIN.) =  12.26

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    140.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =     3.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.94
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.79
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =  12.26
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    140.00 =   438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.201
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.05
  TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =    5.84
  TC(MIN.) =  12.26

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    150.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   482.50
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.84
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =  12.61
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    150.00 =   578.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.47
  TOTAL AREA(ACRES) =      2.40   TOTAL RUNOFF(CFS) =    6.31
```

```
  TC(MIN.) =  12.61

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    3.49
  TOTAL AREA(ACRES) =      3.70   TOTAL RUNOFF(CFS) =    9.81
  TC(MIN.) =  12.61

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    160.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.50  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.07
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.81
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  12.67
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    160.00 =   608.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.156
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =      4.50   TOTAL RUNOFF(CFS) =   11.83
  TC(MIN.) =  12.67

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.156
  *USER SPECIFIED(SUBAREA):
```

```
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =      5.40   TOTAL RUNOFF(CFS) =   14.21
  TC(MIN.) =  12.67

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    170.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.27
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     14.21
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  12.79
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    170.00 =   733.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 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.) =  12.79
  RAINFALL INTENSITY(INCH/HR) =   3.14
  TOTAL STREAM AREA(ACRES) =     5.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.95    13.79        3.033          8.30
      2        1.18     9.75        3.498          0.70
      3       14.21    12.79        3.143          5.40

  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       24.31     9.75       3.498
      2       26.80    12.79       3.143
      3       26.69    13.79       3.033
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     26.80   Tc(MIN.) =   12.79
  TOTAL AREA(ACRES) =     14.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    170.00 =  1308.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.143
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =     14.80   TOTAL RUNOFF(CFS) =   27.37
  TC(MIN.) =  12.79

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.143
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =     15.20   TOTAL RUNOFF(CFS) =   27.93
  TC(MIN.) =  12.79

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    180.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   172.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.32
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     27.93
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  12.88
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    180.00 =  1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    180.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.133
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    1.13
  TOTAL AREA(ACRES) =     16.00   TOTAL RUNOFF(CFS) =   29.06
  TC(MIN.) =  12.88

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    180.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.133
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.71
  TOTAL AREA(ACRES) =     16.50   TOTAL RUNOFF(CFS) =   29.77
  TC(MIN.) =  12.88
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     16.50  TC(MIN.) =     12.88
  PEAK FLOW RATE(CFS)   =     29.77
================================================================================
================================================================================
  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 1982-2003 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                              Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* J-15013C SOUTHWEST VILLAGE                                             *
* 100-YEAR, 6-HOUR STORM EVENT / C=0.45 FOR OFFSITE AREAS                *
* BASIN 200 POST PROJECT                                                 *
 **************************************************************************

  FILE NAME: S102HP00.RAT
  TIME/DATE OF STUDY: 15:25 07/06/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
```

```
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
  3   11.0      6.0    0.020/0.018/0.020   0.50    1.50 0.0313 0.125 0.0130

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    520.00
  DOWNSTREAM ELEVATION(FEET) =    519.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.971
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  519.50  DOWNSTREAM ELEVATION(FEET) =  486.00
  STREET LENGTH(FEET) =   704.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  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) =   0.0180
  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) =  0.26
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    7.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   3.38   Tc(MIN.) =   9.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.567
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    3.72
  TOTAL AREA(ACRES) =      1.30        PEAK FLOW RATE(CFS) =       4.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.78
  FLOW VELOCITY(FEET/SEC.) =  3.96   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =   789.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    230.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =   347.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.38
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.12
  PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =  10.70
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =  1136.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    510.00
  DOWNSTREAM ELEVATION(FEET) =    509.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.171
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.797
 SUBAREA RUNOFF(CFS) =      0.17
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    496.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   123.00   CHANNEL SLOPE =  0.1057
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.521
 *USER SPECIFIED(SUBAREA):
 RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.49
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.41
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   1.46
 Tc(MIN.) =   9.63
 SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.63
 TOTAL AREA(ACRES) =      0.50         PEAK FLOW RATE(CFS) =       0.80

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.87
 LONGEST FLOWPATH FROM NODE    205.00 TO NODE    207.00 =   188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    207.00 TO NODE    209.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  496.00  DOWNSTREAM ELEVATION(FEET) =  494.00
 STREET LENGTH(FEET) =   123.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 11.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.200
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.200

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    2.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =  10.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.413
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       1.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   2.15
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    209.00 =   311.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.413
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    1.40
  TC(MIN.) =  10.34

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.413
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.55
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =    1.95
  TC(MIN.) =  10.34

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   490.50
```

```
  FLOW LENGTH(FEET) =    67.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.94
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.95
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =  10.62
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    210.00 =   378.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.381
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.44
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =    3.39
  TC(MIN.) =  10.62

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    212.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   490.50  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.19
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.39
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =  11.54
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    212.00 =   553.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.281
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.10
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    4.49
  TC(MIN.) =  11.54

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

```
 FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   489.50
 FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.32
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.49
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  11.59
 LONGEST FLOWPATH FROM NODE    205.00 TO NODE    215.00 =   576.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.84
 TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =    5.32
 TC(MIN.) =  11.59

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
 *USER SPECIFIED(SUBAREA):
 INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.31
 TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =    5.63
 TC(MIN.) =  11.59

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    217.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.50  DOWNSTREAM(FEET) =   488.00
 FLOW LENGTH(FEET) =   159.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
```

```
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.63
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =  12.06
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    217.00 =   735.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.224
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.22
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =    7.85
  TC(MIN.) =  12.06

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    228.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   487.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.80
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.85
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  12.13
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    228.00 =   775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    228.00 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.) =  12.13
  RAINFALL INTENSITY(INCH/HR) =   3.22
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.85

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    222.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    84.00
  UPSTREAM ELEVATION(FEET) =    498.00
  DOWNSTREAM ELEVATION(FEET) =    497.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.670
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.00  DOWNSTREAM ELEVATION(FEET) =  496.00
  STREET LENGTH(FEET) =    99.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 11.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =   6.92
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.036
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.23
  FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.42
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =   183.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    223.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.036
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =    1.01
  TC(MIN.) =   6.92

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    225.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.60
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.01
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   7.87
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =   388.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.855
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.30
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    2.31
  TC(MIN.) =   7.87

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    227.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   488.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.31
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   8.59
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    227.00 =   588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.717
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.90
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =    4.21
  TC(MIN.) =   8.59

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    228.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   487.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.21
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   9.23
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    228.00 =   758.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    228.00 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.) =   9.23
  RAINFALL INTENSITY(INCH/HR) =   3.60
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.21

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

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.85    12.13        3.215          3.00
      2        4.21     9.23        3.596          1.30

  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       11.23     9.23       3.596
      2       11.61    12.13       3.215

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     11.61   Tc(MIN.) =   12.13
  TOTAL AREA(ACRES) =      4.30
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    228.00 =   775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    229.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     11.61
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.23
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    229.00 =   838.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    229.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.204
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.30
  TOTAL AREA(ACRES) =      4.40   TOTAL RUNOFF(CFS) =   11.92
  TC(MIN.) =  12.23

****************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    229.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.204
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.22
  TOTAL AREA(ACRES) =      4.80   TOTAL RUNOFF(CFS) =   13.13
  TC(MIN.) =  12.23

**************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    230.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.87
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     13.13
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  12.34
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    230.00 =   921.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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       13.13    12.34        3.193        4.80
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    230.00 =   921.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.12    10.70        3.373        1.30
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =  1136.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      16.56      10.70        3.373
      2      17.04      12.34        3.193

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     17.04   Tc(MIN.) =   12.34
```

```
  TOTAL AREA(ACRES) =      6.10

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    235.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.42
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     17.04
  PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =  13.82
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    235.00 =  1616.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.030
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.73
  TOTAL AREA(ACRES) =      6.70   TOTAL RUNOFF(CFS) =   18.77
  TC(MIN.) =  13.82

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.030
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.59
  TOTAL AREA(ACRES) =      7.60   TOTAL RUNOFF(CFS) =   21.36
  TC(MIN.) =  13.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    268.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.14
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     21.36
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  13.88
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    268.00 =  1651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    268.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    241.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    73.00
  UPSTREAM ELEVATION(FEET) =    494.00
  DOWNSTREAM ELEVATION(FEET) =    493.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.539
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    494.00  DOWNSTREAM(FEET) =    490.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.968
```

```
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.18
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.27
  Tc(MIN.) =   7.27
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =      0.20         PEAK FLOW RATE(CFS) =       0.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    242.00 =   163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    247.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  493.00  DOWNSTREAM ELEVATION(FEET) =  492.00
  STREET LENGTH(FEET) =    84.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  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) =   0.0180
  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) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    6.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =   8.16
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       0.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.85
  FLOW VELOCITY(FEET/SEC.) =  1.65   DEPTH*VELOCITY(FT*FT/SEC.) =   0.40
```

```
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    247.00 =   247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    247.00 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.) =   8.16
  RAINFALL INTENSITY(INCH/HR) =   3.80
  TOTAL STREAM AREA(ACRES) =     0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    245.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    492.00
  DOWNSTREAM ELEVATION(FEET) =    491.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.249
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    246.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  491.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   118.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 11.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =   7.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.988
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.38
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.52
  FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.41
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    246.00 =   193.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    246.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.988
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.66
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    2.37
  TC(MIN.) =   7.17

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    247.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   486.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.11
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.37
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   7.74
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    247.00 =   333.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    247.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.880
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    3.54
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    5.91
  TC(MIN.) =   7.74

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    247.00 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.) =   7.74
  RAINFALL INTENSITY(INCH/HR) =   3.88
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.91

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.91     8.16        3.800          0.30
      2        5.91     7.74        3.880          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        6.81     7.74       3.880
      2        6.71     8.16       3.800

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      6.81   Tc(MIN.) =    7.74
  TOTAL AREA(ACRES) =      2.10
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    247.00 =   333.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    249.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      6.81
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   8.56
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    249.00 =   603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.85
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =    9.66
  TC(MIN.) =   8.56

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    254.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =   239.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.66
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   9.20
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    254.00 =   842.00 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.) =   9.20
  RAINFALL INTENSITY(INCH/HR) =   3.60
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.66

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

```
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    87.00
 UPSTREAM ELEVATION(FEET) =    490.00
 DOWNSTREAM ELEVATION(FEET) =    489.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.808
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.34
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
 FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  488.50
 STREET LENGTH(FEET) =   213.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 11.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.98
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.70
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.14
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.34
 STREET FLOW TRAVEL TIME(MIN.) =   3.10   Tc(MIN.) =   9.10
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.27
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.61
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.77
  FLOW VELOCITY(FEET/SEC.) =  1.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =   300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.38
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =    2.99
  TC(MIN.) =   9.10

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    253.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.50  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.08
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.99
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =  10.09
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    253.00 =   600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    253.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.440
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .7400
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.29
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    5.28
  TC(MIN.) =  10.09

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    254.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.28
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  10.14
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    254.00 =   637.00 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.) =  10.14
  RAINFALL INTENSITY(INCH/HR) =   3.43
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.66     9.20        3.602          3.00
      2        5.28    10.14        3.435          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       14.69     9.20       3.602
      2       14.49    10.14       3.435

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     14.69   Tc(MIN.) =    9.20
  TOTAL AREA(ACRES) =      4.80
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    254.00 =   842.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    255.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   481.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     14.69
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   9.33
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    255.00 =   897.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    255.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.577
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =      5.00   TOTAL RUNOFF(CFS) =   15.37
  TC(MIN.) =   9.33

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    260.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.50  DOWNSTREAM(FEET) =   481.25
  FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.18
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     15.37
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.35
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    260.00 =   908.00 FEET.

****************************************************************************
  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.) =   9.35
  RAINFALL INTENSITY(INCH/HR) =   3.57
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.37

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

```
 FLOW PROCESS FROM NODE    256.00 TO NODE    257.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
 UPSTREAM ELEVATION(FEET) =    491.00
 DOWNSTREAM ELEVATION(FEET) =    490.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.458
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.74
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
 FLOW PROCESS FROM NODE    257.00 TO NODE    258.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   485.00
 FLOW LENGTH(FEET) =   288.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.91
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.74
 PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   7.65
 LONGEST FLOWPATH FROM NODE    256.00 TO NODE    258.00 =   373.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.897
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8400
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.62
 TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =    3.36
 TC(MIN.) =   7.65

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    259.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.36
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   7.71
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    259.00 =   398.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    259.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.885
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =    4.35
  TC(MIN.) =   7.71

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    260.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   481.25
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.32
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.35
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   7.90
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    260.00 =   493.00 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.) =   7.90
  RAINFALL INTENSITY(INCH/HR) =   3.85
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.35
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       15.37     9.35        3.574          5.00
      2        4.35     7.90        3.849          1.30

  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       18.62     7.90       3.849
      2       19.41     9.35       3.574

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     19.41   Tc(MIN.) =    9.35
  TOTAL AREA(ACRES) =      6.30
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    260.00 =   908.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    261.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.25  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     19.41
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   9.47
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    261.00 =   953.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.551
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =      6.40   TOTAL RUNOFF(CFS) =   19.75
  TC(MIN.) =   9.47
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.551
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =      6.50   TOTAL RUNOFF(CFS) =   20.08
  TC(MIN.) =   9.47

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    265.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   479.00
  FLOW LENGTH(FEET) =   203.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.95
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     20.08
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   9.90
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    265.00 =  1156.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.470
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    3.63
  TOTAL AREA(ACRES) =      7.60   TOTAL RUNOFF(CFS) =   23.71
  TC(MIN.) =   9.90

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    268.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  13.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.47
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     23.71
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  10.02
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    268.00 =  1226.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    268.00 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       23.71    10.02        3.448        7.60
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    268.00 =  1226.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1       21.36    13.88        3.023        7.60
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    268.00 =  1651.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      42.44      10.02        3.448
      2      42.15      13.88        3.023

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     42.44   Tc(MIN.) =   10.02
  TOTAL AREA(ACRES) =     15.20

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    268.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    269.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   475.00
  FLOW LENGTH(FEET) =   474.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
```

```
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     42.44
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =  11.01
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    269.00 =  2125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.339
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    3.17
  TOTAL AREA(ACRES) =     16.20   TOTAL RUNOFF(CFS) =   45.61
  TC(MIN.) =  11.01

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    287.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.72
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     45.61
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =  11.45
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    287.00 =  2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    271.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.00
  UPSTREAM ELEVATION(FEET) =    496.00
  DOWNSTREAM ELEVATION(FEET) =    495.00
```

```
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.393
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    271.00 TO NODE    272.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  495.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   134.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.17
    HALFSTREET FLOOD WIDTH(FEET) =    3.06
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.38
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =   6.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.026
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.19   HALFSTREET FLOOD WIDTH(FEET) =   4.32
  FLOW VELOCITY(FEET/SEC.) =  2.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.46
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    272.00 =   230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    272.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.026
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7300
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.18
TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =    2.50
TC(MIN.) =   6.97

****************************************************************************
FLOW PROCESS FROM NODE    272.00 TO NODE    273.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   485.00
FLOW LENGTH(FEET) =   257.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.29
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      2.50
PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   7.97
LONGEST FLOWPATH FROM NODE    270.00 TO NODE    273.00 =   487.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    273.00 TO NODE    273.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.836
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .6100
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.11
TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =    4.60
TC(MIN.) =   7.97

****************************************************************************
FLOW PROCESS FROM NODE    273.00 TO NODE    274.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
FLOW LENGTH(FEET) =   177.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.43
GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      4.60
PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   8.63
LONGEST FLOWPATH FROM NODE    270.00 TO NODE    274.00 =   664.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    274.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.710
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.67
  TOTAL AREA(ACRES) =      2.60   TOTAL RUNOFF(CFS) =    7.28
  TC(MIN.) =   8.63

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    275.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   141.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.28
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   9.06
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    275.00 =   805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    275.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.628
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.78
  TOTAL AREA(ACRES) =      3.20   TOTAL RUNOFF(CFS) =    9.06
  TC(MIN.) =   9.06

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    280.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    77.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.06
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   9.24
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    280.00 =   882.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    280.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.594
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =    9.64
  TC(MIN.) =   9.24

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    280.00 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.) =   9.24
  RAINFALL INTENSITY(INCH/HR) =   3.59
  TOTAL STREAM AREA(ACRES) =     3.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.64

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    277.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    98.00
  UPSTREAM ELEVATION(FEET) =    492.00
  DOWNSTREAM ELEVATION(FEET) =    491.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.487
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    278.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  491.00  DOWNSTREAM ELEVATION(FEET) =  489.00
  STREET LENGTH(FEET) =   169.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    4.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =   7.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.836
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.24
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   6.38
  FLOW VELOCITY(FEET/SEC.) =  1.60   DEPTH*VELOCITY(FT*FT/SEC.) =   0.37
  LONGEST FLOWPATH FROM NODE    276.00 TO NODE    278.00 =   267.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    278.00 TO NODE    278.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.836
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.52
  TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =    3.09
  TC(MIN.) =   7.97
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    278.00 TO NODE    280.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =   248.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.09
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   8.76
  LONGEST FLOWPATH FROM NODE    276.00 TO NODE    280.00 =   515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    280.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.685
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.36
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    5.45
  TC(MIN.) =   8.76

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    280.00 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.) =   8.76
  RAINFALL INTENSITY(INCH/HR) =   3.69
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.45

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.64     9.24        3.594          3.40
      2        5.45     8.76        3.685          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       14.85     8.76       3.685
      2       14.95     9.24       3.594

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     14.95   Tc(MIN.) =    9.24
  TOTAL AREA(ACRES) =      5.20
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    280.00 =   882.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    281.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.98
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     14.95
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.29
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    281.00 =   916.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    281.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.584
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.70
  TOTAL AREA(ACRES) =      5.80   TOTAL RUNOFF(CFS) =   16.65
  TC(MIN.) =   9.29

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    281.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.584
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.58
```

```
  TOTAL AREA(ACRES) =      6.70   TOTAL RUNOFF(CFS) =   19.23
  TC(MIN.) =   9.29

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    287.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   137.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.58
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     19.23
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   9.43
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    287.00 =  1053.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.558
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.80
  TOTAL AREA(ACRES) =      7.20   TOTAL RUNOFF(CFS) =   20.03
  TC(MIN.) =   9.43

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.558
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.80
  TOTAL AREA(ACRES) =      7.70   TOTAL RUNOFF(CFS) =   20.83
  TC(MIN.) =   9.43

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 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       20.83     9.43       3.558        7.70
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    287.00 =  1053.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1       45.61    11.45       3.291       16.20
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    287.00 =  2435.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      63.01       9.43        3.558
      2      64.87      11.45        3.291

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     64.87   Tc(MIN.) =   11.45
  TOTAL AREA(ACRES) =     23.90

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  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.) =  11.45
  RAINFALL INTENSITY(INCH/HR) =   3.29
  TOTAL STREAM AREA(ACRES) =    23.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     64.87

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    283.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.00
  UPSTREAM ELEVATION(FEET) =    492.00
```

```
  DOWNSTREAM ELEVATION(FEET) =    491.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.104
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    284.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    485.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1195.00   CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.72
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   7.31
  Tc(MIN.) =  16.41
  SUBAREA AREA(ACRES) =    12.30       SUBAREA RUNOFF(CFS) =   15.43
  TOTAL AREA(ACRES) =     12.40         PEAK FLOW RATE(CFS) =      15.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   3.28
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    284.00 =  1269.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    284.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    7.20   SUBAREA RUNOFF(CFS) =    9.03
  TOTAL AREA(ACRES) =     19.60   TOTAL RUNOFF(CFS) =   24.62
  TC(MIN.) =  16.41

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    285.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    485.00  DOWNSTREAM(FEET) =    480.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   671.00   CHANNEL SLOPE =  0.0075
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.636
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     29.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.93
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   1.89
  Tc(MIN.) =  18.30
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =    8.90
  TOTAL AREA(ACRES) =     27.10         PEAK FLOW RATE(CFS) =      33.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   6.17
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    285.00 =  1940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    285.00 TO NODE    285.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.636
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    9.70   SUBAREA RUNOFF(CFS) =   11.51
  TOTAL AREA(ACRES) =     36.80   TOTAL RUNOFF(CFS) =   45.02
  TC(MIN.) =  18.30

****************************************************************************
  FLOW PROCESS FROM NODE    285.00 TO NODE    287.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   590.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  22.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.46
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     45.02
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =  19.46
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    287.00 =  2530.00 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.) =  19.46
  RAINFALL INTENSITY(INCH/HR) =   2.54
  TOTAL STREAM AREA(ACRES) =    36.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.02

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       64.87    11.45        3.291         23.90
      2       45.02    19.46        2.543         36.80

  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       99.66    11.45       3.291
      2       95.15    19.46       2.543

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     99.66   Tc(MIN.) =   11.45
  TOTAL AREA(ACRES) =     60.70
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    287.00 =  2530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    290.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   390.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  48.88
  GIVEN PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     99.66
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  11.50
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    290.00 =  2690.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     60.70  TC(MIN.) =     11.50
  PEAK FLOW RATE(CFS)   =     99.66
============================================================================
```

==========

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 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
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                         619-291-0707   Fax 619-291-4165

 ************************ DESCRIPTION OF STUDY *************************
* J-15013C SOUTHWEST VILLAGE                                           *
* 100-YEAR, 6-HOUR STORM EVENT                                         *
* BASIN 300 POST-PROJECT                                               *
 **********************************************************************

  FILE NAME: S103HP00.RAT
  TIME/DATE OF STUDY: 15:08 02/15/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0160

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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    300.00 TO NODE    302.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    304.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   96.14
  STREET LENGTH(FEET) =   193.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.37
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   1.15   Tc(MIN.) =    6.15
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.182
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =     3.10     SUBAREA RUNOFF(CFS) =   10.11
  TOTAL AREA(ACRES) =        3.2        PEAK FLOW RATE(CFS) =      10.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.24
  FLOW VELOCITY(FEET/SEC.) =  3.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     193.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 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) =   100.00  DOWNSTREAM(FEET) =    99.55
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.44
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.26
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =     238.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.161
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.30
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      11.68
  TC(MIN.) =    6.26

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    308.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.34
  FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.93
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.68
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.42
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    308.00 =     304.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    308.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.131
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.61
  TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =      13.21
  TC(MIN.) =    6.42

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.99
  FLOW LENGTH(FEET) =   101.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.21
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    6.65
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =     405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.086
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.59
  TOTAL AREA(ACRES) =        4.6   TOTAL RUNOFF(CFS) =      14.66
  TC(MIN.) =    6.65

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 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) =   100.00  DOWNSTREAM(FEET) =    99.55
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.15
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.66
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    6.76
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    312.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.066
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.59
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =      16.17
  TC(MIN.) =    6.76

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    319.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.39
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.17
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.89
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    319.00 =     511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    319.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.040
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    2.10   SUBAREA RUNOFF(CFS) =    6.62
  TOTAL AREA(ACRES) =        7.2   TOTAL RUNOFF(CFS) =      22.69
  TC(MIN.) =    6.89

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 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) =   100.00  DOWNSTREAM(FEET) =    92.47
  FLOW LENGTH(FEET) =   753.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.18
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.69
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    8.43
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    323.00 =    1264.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.748
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    2.20   SUBAREA RUNOFF(CFS) =    6.43
  TOTAL AREA(ACRES) =        9.4   TOTAL RUNOFF(CFS) =      27.48
  TC(MIN.) =    8.43

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    331.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.92
  FLOW LENGTH(FEET) =   108.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.43
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.48
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    8.64
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    331.00 =    1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.708
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    4.30   SUBAREA RUNOFF(CFS) =   12.44
  TOTAL AREA(ACRES) =       13.7   TOTAL RUNOFF(CFS) =      39.62
  TC(MIN.) =    8.64

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.61
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.39
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.62
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.71
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    332.00 =    1411.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    332.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.695
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    3.17
  TOTAL AREA(ACRES) =       14.8   TOTAL RUNOFF(CFS) =      42.65
  TC(MIN.) =    8.71

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    337.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.95
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.51
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.65
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    8.90
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    337.00 =    1516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.660
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    2.70   SUBAREA RUNOFF(CFS) =    7.71
  TOTAL AREA(ACRES) =       17.5   TOTAL RUNOFF(CFS) =      49.95
  TC(MIN.) =    8.90

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    351.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    92.86
  FLOW LENGTH(FEET) =   714.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.66
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.95
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   10.13
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    351.10 =    2230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    351.10 TO NODE    351.10 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) =   3.44
  TOTAL STREAM AREA(ACRES) =    17.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     49.95

****************************************************************************
  FLOW PROCESS FROM NODE    339.10 TO NODE    339.20 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    339.20 TO NODE    340.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   95.64
  STREET LENGTH(FEET) =   218.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =    6.35
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.144
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    3.78
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.12
  FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    339.10 TO NODE    340.00 =     308.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    342.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.37
  FLOW LENGTH(FEET) =   163.00   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.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.13
```

```
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    6.85
  LONGEST FLOWPATH FROM NODE    339.10 TO NODE    342.00 =     471.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    342.00 TO NODE    342.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.048
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    4.37
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       8.40
  TC(MIN.) =    6.85

****************************************************************************
  FLOW PROCESS FROM NODE    342.00 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) =   100.00  DOWNSTREAM(FEET) =    98.02
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.40
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    7.37
  LONGEST FLOWPATH FROM NODE    339.10 TO NODE    344.00 =     669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    344.00 TO NODE    344.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.950
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    3.61
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      11.80
  TC(MIN.) =    7.37

****************************************************************************
  FLOW PROCESS FROM NODE    344.00 TO NODE    346.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    97.01
  FLOW LENGTH(FEET) =   299.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.80
```

```
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    8.09
  LONGEST FLOWPATH FROM NODE    339.10 TO NODE    346.00 =     968.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    346.00 TO NODE    346.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.813
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    4.11
  TOTAL AREA(ACRES) =        4.9   TOTAL RUNOFF(CFS) =      15.51
  TC(MIN.) =    8.09

****************************************************************************
  FLOW PROCESS FROM NODE    346.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.94
  FLOW LENGTH(FEET) =   106.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.51
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    8.33
  LONGEST FLOWPATH FROM NODE    339.10 TO NODE    350.00 =    1074.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.768
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    2.50   SUBAREA RUNOFF(CFS) =    7.82
  TOTAL AREA(ACRES) =        7.4   TOTAL RUNOFF(CFS) =      23.14
  TC(MIN.) =    8.33

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    351.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.17
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
```

```
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE    339.10 TO NODE    351.10 =    1157.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    351.10 TO NODE    351.10 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.) =    8.49
  RAINFALL INTENSITY(INCH/HR) =   3.74
  TOTAL STREAM AREA(ACRES) =     7.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.14

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       49.95    10.13        3.436         17.50
      2       23.14     8.49        3.736          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       65.04     8.49       3.736
      2       71.24    10.13       3.436

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      71.24   Tc(MIN.) =   10.13
  TOTAL AREA(ACRES) =       24.9
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    351.10 =    2230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    351.10 TO NODE    357.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.02
  FLOW LENGTH(FEET) =    98.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.73
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      71.24
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    357.10 =    2328.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    357.10 TO NODE    357.10 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.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   3.42
  TOTAL STREAM AREA(ACRES) =    24.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     71.24

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    353.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    354.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   96.78
  STREET LENGTH(FEET) =   161.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    6.14
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =    6.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.177
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.39
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.72
  FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.66
  LONGEST FLOWPATH FROM NODE    352.00 TO NODE    354.00 =    9161.00 FEET.

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

```
  FLOW PROCESS FROM NODE    354.00 TO NODE    355.00 IS CODE =  31
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.67
  FLOW LENGTH(FEET) =    33.00   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.) =   4.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.73
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.30
  LONGEST FLOWPATH FROM NODE    352.00 TO NODE    355.00 =    9194.00 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE    355.00 TO NODE    355.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.152
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    3.79
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.51
  TC(MIN.) =    6.30

**********************************************************************
  FLOW PROCESS FROM NODE    355.00 TO NODE    356.00 IS CODE =  31
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    96.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.51
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =    7.31
  LONGEST FLOWPATH FROM NODE    352.00 TO NODE    356.00 =    9544.00 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.961
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.63
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       7.89
  TC(MIN.) =    7.31
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    357.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.15
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.89
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE    352.00 TO NODE    357.00 =    9629.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    357.00 TO NODE    357.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.918
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.28
  TOTAL AREA(ACRES) =        3.1   TOTAL RUNOFF(CFS) =      10.08
  TC(MIN.) =    7.54

****************************************************************************
  FLOW PROCESS FROM NODE    357.00 TO NODE    357.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.64
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.08
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE    352.00 TO NODE    357.10 =    9665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    357.10 TO NODE    357.10 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.) =    7.63
  RAINFALL INTENSITY(INCH/HR) =   3.90
  TOTAL STREAM AREA(ACRES) =     3.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.08
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       71.24    10.28        3.419         24.90
      2       10.08     7.63        3.901          3.10

  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       72.52     7.63       3.901
      2       80.08    10.28       3.419

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      80.08   Tc(MIN.) =   10.28
  TOTAL AREA(ACRES) =       28.0
  LONGEST FLOWPATH FROM NODE    352.00 TO NODE    357.10 =    9665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    357.10 TO NODE    358.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.44
  FLOW LENGTH(FEET) =   156.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.14
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.08
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE    352.00 TO NODE    358.00 =    9821.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    358.00 TO NODE    358.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.394
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7995
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.97
  TOTAL AREA(ACRES) =       28.7   TOTAL RUNOFF(CFS) =      80.08
  TC(MIN.) =   10.51
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    358.00 TO NODE    367.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.77
  FLOW LENGTH(FEET) =   123.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.14
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.08
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.70
  LONGEST FLOWPATH FROM NODE    352.00 TO NODE    367.00 =    9944.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    367.00 TO NODE    367.00 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.) =   10.70
  RAINFALL INTENSITY(INCH/HR) =   3.37
  TOTAL STREAM AREA(ACRES) =    28.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     80.08

****************************************************************************
  FLOW PROCESS FROM NODE    359.00 TO NODE    359.10 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    359.10 TO NODE    360.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   97.18
  STREET LENGTH(FEET) =   141.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    5.92
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.225
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.81
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.16

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.95
 FLOW VELOCITY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
 LONGEST FLOWPATH FROM NODE    359.00 TO NODE    360.00 =  900141.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    360.00 TO NODE    362.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.31
 FLOW LENGTH(FEET) =   169.00   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.) =   5.01
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.16
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    6.48
 LONGEST FLOWPATH FROM NODE    359.00 TO NODE    362.00 =  900310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    362.00 TO NODE    362.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.118
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
 SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.73
 TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       5.81
 TC(MIN.) =    6.48

****************************************************************************
 FLOW PROCESS FROM NODE    362.00 TO NODE    364.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.08
 FLOW LENGTH(FEET) =    92.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.87
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.81
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    6.74
 LONGEST FLOWPATH FROM NODE    359.00 TO NODE    364.00 =  900402.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    364.00 TO NODE    364.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.069
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.36
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       8.11
  TC(MIN.) =    6.74

****************************************************************************
  FLOW PROCESS FROM NODE    364.00 TO NODE    366.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.06
  FLOW LENGTH(FEET) =   194.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.11
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    7.26
  LONGEST FLOWPATH FROM NODE    359.00 TO NODE    366.00 =  900596.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    366.00 TO NODE    366.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.971
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    3.96
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      11.87
  TC(MIN.) =    7.26

****************************************************************************
  FLOW PROCESS FROM NODE    366.00 TO NODE    367.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.64
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.95
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.87
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.34
  LONGEST FLOWPATH FROM NODE    359.00 TO NODE    367.00 =  900632.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    367.00 TO NODE    367.00 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.) =    7.34
  RAINFALL INTENSITY(INCH/HR) =   3.95
  TOTAL STREAM AREA(ACRES) =     3.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.87

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       80.08    10.70        3.373         28.70
      2       11.87     7.34        3.955          3.60

  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       80.16     7.34       3.955
      2       90.20    10.70       3.373

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      90.20   Tc(MIN.) =   10.70
  TOTAL AREA(ACRES) =       32.3
  LONGEST FLOWPATH FROM NODE    359.00 TO NODE    367.00 =  900632.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    367.00 TO NODE    398.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.92
  FLOW LENGTH(FEET) =   108.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.32
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.20
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.86
  LONGEST FLOWPATH FROM NODE    359.00 TO NODE    398.00 =  900740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    367.10 TO NODE    367.20 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 SUBAREA RUNOFF(CFS) =      0.34
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
 FLOW PROCESS FROM NODE    367.20 TO NODE    368.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     93.94
 CHANNEL LENGTH THRU SUBAREA(FEET) =   303.00   CHANNEL SLOPE =  0.0200
 CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.867
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.80
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   2.81
 Tc(MIN.) =    7.81
 SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.60
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.90

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   2.03
 LONGEST FLOWPATH FROM NODE    367.10 TO NODE    368.00 = ********** FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    368.00 TO NODE    370.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.02
 FLOW LENGTH(FEET) =    98.00   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.) =   3.51
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.90
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    8.27
 LONGEST FLOWPATH FROM NODE    367.10 TO NODE    370.00 = ********** FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    370.00 TO NODE    370.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
 SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.06
 TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       2.95
```

```
  TC(MIN.) =    8.27

****************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    372.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.59
  FLOW LENGTH(FEET) =   141.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.95
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    8.75
  LONGEST FLOWPATH FROM NODE    367.10 TO NODE    372.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    372.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.688
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.01
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       4.89
  TC(MIN.) =    8.75

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.63
  FLOW LENGTH(FEET) =   137.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.89
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    9.15
  LONGEST FLOWPATH FROM NODE    367.10 TO NODE    374.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.611
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
```

```
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.41
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       6.20
  TC(MIN.) =    9.15

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    379.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.96
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.96
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.20
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.44
  LONGEST FLOWPATH FROM NODE    367.10 TO NODE    379.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    379.00 TO NODE    379.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.556
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7800
  SUBAREA AREA(ACRES) =    2.20   SUBAREA RUNOFF(CFS) =    6.10
  TOTAL AREA(ACRES) =        4.4   TOTAL RUNOFF(CFS) =      12.20
  TC(MIN.) =    9.44

****************************************************************************
  FLOW PROCESS FROM NODE    379.00 TO NODE    380.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.26
  FLOW LENGTH(FEET) =    74.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.20
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    9.62
  LONGEST FLOWPATH FROM NODE    367.10 TO NODE    380.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    380.00 TO NODE    380.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.522
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7907
```

```
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    3.51
  TOTAL AREA(ACRES) =        5.6   TOTAL RUNOFF(CFS) =      15.60
  TC(MIN.) =    9.62

****************************************************************************
  FLOW PROCESS FROM NODE    380.00 TO NODE    382.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.56
  FLOW LENGTH(FEET) =   144.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.60
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.94
  LONGEST FLOWPATH FROM NODE    367.10 TO NODE    382.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    382.00 TO NODE    382.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.461
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7951
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.01
  TOTAL AREA(ACRES) =        6.3   TOTAL RUNOFF(CFS) =      17.34
  TC(MIN.) =    9.94

****************************************************************************
  FLOW PROCESS FROM NODE    382.00 TO NODE    384.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.36
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.34
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.08
  LONGEST FLOWPATH FROM NODE    367.10 TO NODE    384.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    384.00 TO NODE    384.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.441
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7994
```

```
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.57
  TOTAL AREA(ACRES) =        7.2   TOTAL RUNOFF(CFS) =      19.81
  TC(MIN.) =   10.08

****************************************************************************
  FLOW PROCESS FROM NODE    385.00 TO NODE    399.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.92
  FLOW LENGTH(FEET) =   108.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.81
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE    367.10 TO NODE    399.00 = ********** FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.2  TC(MIN.) =     10.31
  PEAK FLOW RATE(CFS)   =      19.81
============================================================================
============================================================================
  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 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
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                           San Diego, California 92110
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 ************************ DESCRIPTION OF STUDY *************************
* J-15013C SOUTHWEST VILLAGE                                           *
* 100-YEAR, 6-HOUR STORM EVENT                                         *
* BASIN 1400 - MOODY CANYON POST UNDETAINED                            *
 **********************************************************************

  FILE NAME: S1014U00.RAT
  TIME/DATE OF STUDY: 12:08 02/18/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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   1400.00 TO NODE   1401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.269
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.349
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE   1401.00 TO NODE   1402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   83.00
  STREET LENGTH(FEET) =   850.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   15.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   4.15   Tc(MIN.) =    9.42
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.560
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   32.64
  TOTAL AREA(ACRES) =       13.4        PEAK FLOW RATE(CFS) =      33.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  20.40
```

```
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.04
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  850.0 FT WITH ELEVATION-DROP =  17.0 FT, IS   39.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE   1402.00
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1402.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1402.00 TO NODE   1404.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     52.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00   CHANNEL SLOPE =  0.0500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.225
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      46.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.04
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   2.62
  Tc(MIN.) =   12.04
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   26.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.576
  TOTAL AREA(ACRES) =       30.7         PEAK FLOW RATE(CFS) =      57.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   6.46
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1404.00 =    1900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1404.00 TO NODE   1404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.225
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6085
  SUBAREA AREA(ACRES) =    5.20   SUBAREA RUNOFF(CFS) =   13.42
  TOTAL AREA(ACRES) =       35.9   TOTAL RUNOFF(CFS) =      70.45
  TC(MIN.) =   12.04

****************************************************************************
  FLOW PROCESS FROM NODE   1404.00 TO NODE   1405.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     43.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1415.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.859
  *USER SPECIFIED(SUBAREA):
```

```
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      86.19
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.79
  AVERAGE FLOW DEPTH(FEET) =   0.93   TRAVEL TIME(MIN.) =   3.47
  Tc(MIN.) =   15.51
  SUBAREA AREA(ACRES) =    24.40       SUBAREA RUNOFF(CFS) =   31.39
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.544
  TOTAL AREA(ACRES) =       60.3         PEAK FLOW RATE(CFS) =      93.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   7.01
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1405.00 =    3315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1405.00 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.) =   15.51
  RAINFALL INTENSITY(INCH/HR) =   2.86
  TOTAL STREAM AREA(ACRES) =    60.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     93.84

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    199.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  12.88   RAIN INTENSITY(INCH/HOUR) =  3.13
  TOTAL AREA(ACRES) =    16.50   TOTAL RUNOFF(CFS) =     29.77

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE   1405.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     70.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.884
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.87
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.40
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   2.31
  Tc(MIN.) =   15.19
  SUBAREA AREA(ACRES) =    18.60       SUBAREA RUNOFF(CFS) =   24.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.509
  TOTAL AREA(ACRES) =       35.1         PEAK FLOW RATE(CFS) =      51.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   5.78
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE   1405.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1405.00 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.) =   15.19
  RAINFALL INTENSITY(INCH/HR) =   2.88
  TOTAL STREAM AREA(ACRES) =    35.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     51.55

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       93.84    15.51        2.859         60.30
      2       51.55    15.19        2.884         35.10

  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      143.45    15.19       2.884
      2      144.93    15.51       2.859

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     144.93   Tc(MIN.) =   15.51
  TOTAL AREA(ACRES) =       95.4
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1405.00 =    3315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     81.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   475.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.780
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     148.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.99
  AVERAGE FLOW DEPTH(FEET) =   1.24   TRAVEL TIME(MIN.) =   0.99
  Tc(MIN.) =   16.51
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    6.38
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.527
  TOTAL AREA(ACRES) =      100.5         PEAK FLOW RATE(CFS) =     147.29
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.23   FLOW VELOCITY(FEET/SEC.) =   8.00
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1410.00 =    3790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1410.00 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.) =   16.51
  RAINFALL INTENSITY(INCH/HR) =   2.78
  TOTAL STREAM AREA(ACRES) =   100.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    147.29

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE    299.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  11.50   RAIN INTENSITY(INCH/HOUR) =  3.29
  TOTAL AREA(ACRES) =    60.70   TOTAL RUNOFF(CFS) =     99.66

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE   1410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     58.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.024
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     112.05
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.38
  AVERAGE FLOW DEPTH(FEET) =   1.07   TRAVEL TIME(MIN.) =   2.37
  Tc(MIN.) =   13.87
  SUBAREA AREA(ACRES) =    18.20       SUBAREA RUNOFF(CFS) =   24.77
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.488
  TOTAL AREA(ACRES) =       78.9         PEAK FLOW RATE(CFS) =     116.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   7.46
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE   1410.00 =    1800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1410.00 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.) =   13.87
  RAINFALL INTENSITY(INCH/HR) =   3.02
  TOTAL STREAM AREA(ACRES) =    78.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    116.51

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)      (MIN.)   (INCH/HOUR)    (ACRE)
      1      147.29    16.51         2.780        100.50
      2      116.51    13.87         3.024         78.90

  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      251.89    13.87        3.024
      2      254.38    16.51        2.780

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     254.38   Tc(MIN.) =   16.51
  TOTAL AREA(ACRES) =      179.4
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1410.00 =    3790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1420.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     60.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.638
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     263.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.44
  AVERAGE FLOW DEPTH(FEET) =   1.67   TRAVEL TIME(MIN.) =   1.76
  Tc(MIN.) =   18.27
  SUBAREA AREA(ACRES) =    16.00       SUBAREA RUNOFF(CFS) =   19.00
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.505
  TOTAL AREA(ACRES) =      195.4         PEAK FLOW RATE(CFS) =     260.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.66   FLOW VELOCITY(FEET/SEC.) =   9.43
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1420.00 =    4790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1420.00 TO NODE   1420.00 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) =   2.64
  TOTAL STREAM AREA(ACRES) =   195.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    260.46

****************************************************************************
  FLOW PROCESS FROM NODE   1416.00 TO NODE   1417.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE   1417.00 TO NODE   1418.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     54.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   760.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.336
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.12
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   2.47
  Tc(MIN.) =   11.03
  SUBAREA AREA(ACRES) =     1.40       SUBAREA RUNOFF(CFS) =    2.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       2.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   6.31
  LONGEST FLOWPATH FROM NODE   1416.00 TO NODE   1418.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1418.00 TO NODE   1420.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     51.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   490.00   CHANNEL SLOPE =  0.1000
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.043
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.06
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   2.67
  Tc(MIN.) =   13.70
  SUBAREA AREA(ACRES) =     2.20       SUBAREA RUNOFF(CFS) =    3.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       5.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   3.42
  LONGEST FLOWPATH FROM NODE   1416.00 TO NODE   1420.00 =    1350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1420.00 TO NODE   1420.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.70
  RAINFALL INTENSITY(INCH/HR) =   3.04
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      260.46    18.27        2.638        195.40
      2        5.07    13.70        3.043          3.70

  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      230.91    13.70       3.043
      2      264.85    18.27       2.638

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     264.85   Tc(MIN.) =   18.27
  TOTAL AREA(ACRES) =      199.1
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1420.00 =    4790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1420.00 TO NODE   1430.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =      0.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2500.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.348
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     299.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.77
  AVERAGE FLOW DEPTH(FEET) =   1.79   TRAVEL TIME(MIN.) =   4.26
  Tc(MIN.) =   22.53
  SUBAREA AREA(ACRES) =    66.00       SUBAREA RUNOFF(CFS) =   69.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.491
  TOTAL AREA(ACRES) =      265.1         PEAK FLOW RATE(CFS) =     305.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.80   FLOW VELOCITY(FEET/SEC.) =   9.84
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1430.00 =    7290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1430.00 TO NODE   1430.00 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.) =   22.53
  RAINFALL INTENSITY(INCH/HR) =   2.35
  TOTAL STREAM AREA(ACRES) =   265.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    305.44

****************************************************************************
  FLOW PROCESS FROM NODE   1427.00 TO NODE   1428.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE   1428.00 TO NODE   1429.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    200.00  DOWNSTREAM(FEET) =     56.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2400.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.020
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.49
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   5.34
  Tc(MIN.) =   13.91
  SUBAREA AREA(ACRES) =     4.80       SUBAREA RUNOFF(CFS) =    6.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        4.9         PEAK FLOW RATE(CFS) =       6.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   9.36
  LONGEST FLOWPATH FROM NODE   1427.00 TO NODE   1429.00 =    2500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1429.00 TO NODE   1430.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    96.25
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.66
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   14.02
  LONGEST FLOWPATH FROM NODE   1427.00 TO NODE   1430.00 =    2575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1430.00 TO NODE   1430.00 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.) =   14.02
  RAINFALL INTENSITY(INCH/HR) =   3.01
  TOTAL STREAM AREA(ACRES) =     4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.66

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      305.44    22.53        2.348        265.10
      2        6.66    14.02        3.008          4.90
```

```
  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      245.08    14.02       3.008
      2      310.63    22.53       2.348

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     310.63   Tc(MIN.) =   22.53
  TOTAL AREA(ACRES) =      270.0
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1430.00 =    7290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1430.00 TO NODE   1498.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.15
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     310.63
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   22.59
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1498.00 =    7355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1498.00 TO NODE   1498.00 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.) =   22.59
  RAINFALL INTENSITY(INCH/HR) =   2.34
  TOTAL STREAM AREA(ACRES) =   270.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    310.63

****************************************************************************
  FLOW PROCESS FROM NODE   1450.00 TO NODE   1451.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
SUBAREA RUNOFF(CFS) =      0.17
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
FLOW PROCESS FROM NODE   1451.00 TO NODE   1453.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     43.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00   CHANNEL SLOPE =  0.0600
CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   4.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.319
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.03
AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   2.63
Tc(MIN.) =   11.19
SUBAREA AREA(ACRES) =     2.40       SUBAREA RUNOFF(CFS) =    3.58
AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
TOTAL AREA(ACRES) =        2.5         PEAK FLOW RATE(CFS) =       3.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   7.74
LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1453.00 =    1050.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   1453.00 TO NODE   1453.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.319
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
SUBAREA AREA(ACRES) =    2.30   SUBAREA RUNOFF(CFS) =    3.44
TOTAL AREA(ACRES) =        4.8   TOTAL RUNOFF(CFS) =       7.17
TC(MIN.) =   11.19

****************************************************************************
FLOW PROCESS FROM NODE   1453.00 TO NODE   1454.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     25.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1250.00   CHANNEL SLOPE =  0.0600
CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   4.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.101
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.49
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.99
  Tc(MIN.) =   13.17
  SUBAREA AREA(ACRES) =     3.40       SUBAREA RUNOFF(CFS) =    4.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        8.2         PEAK FLOW RATE(CFS) =      11.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =  11.09
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1454.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1454.00 TO NODE   1454.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.101
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    6.84
  TOTAL AREA(ACRES) =       13.1   TOTAL RUNOFF(CFS) =      18.28
  TC(MIN.) =   13.17

****************************************************************************
  FLOW PROCESS FROM NODE   1454.00 TO NODE   1455.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     37.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.952
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.94
  AVERAGE FLOW DEPTH(FEET) =   0.75   TRAVEL TIME(MIN.) =   1.35
  Tc(MIN.) =   14.53
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    2.39
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       14.9         PEAK FLOW RATE(CFS) =      19.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.76   FLOW VELOCITY(FEET/SEC.) =  13.02
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1455.00 =    3350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1455.00 TO NODE   1455.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.952
```

```
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =       15.1   TOTAL RUNOFF(CFS) =      20.06
  TC(MIN.) =   14.53

****************************************************************************
  FLOW PROCESS FROM NODE   1455.00 TO NODE   1498.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    71.50
  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   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.06
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   14.56
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1498.00 =    3410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1498.00 TO NODE   1498.00 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.) =   14.56
  RAINFALL INTENSITY(INCH/HR) =   2.95
  TOTAL STREAM AREA(ACRES) =    15.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.06

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      310.63    22.59        2.345        270.00
      2       20.06    14.56        2.949         15.10

  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      267.05    14.56       2.949
      2      326.58    22.59       2.345

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     326.58   Tc(MIN.) =   22.59
  TOTAL AREA(ACRES) =      285.1
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1498.00 =    7355.00 FEET.

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

```
 FLOW PROCESS FROM NODE   1498.00 TO NODE   1499.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    71.50
 FLOW LENGTH(FEET) =   570.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  28.68
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     326.58
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   22.92
 LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1499.00 =    7925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1499.00 TO NODE   1499.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1470.00 TO NODE   1471.00 IS CODE =  22
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 USER SPECIFIED Tc(MIN.) =    5.000
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 SUBAREA RUNOFF(CFS) =      0.39
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
 FLOW PROCESS FROM NODE   1471.00 TO NODE   1472.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   84.50
 STREET LENGTH(FEET) =   775.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 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) =   0.0180
 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) =    7.78
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   5.64   Tc(MIN.) =   10.64
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.379
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.880
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.38
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.78
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE   1470.00 TO NODE   1472.00 =    1345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1472.00 TO NODE   1472.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.379
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8800
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.89
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.57
  TC(MIN.) =   10.64

****************************************************************************
  FLOW PROCESS FROM NODE   1472.00 TO NODE   1474.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.57
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE   1470.00 TO NODE   1474.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1474.00 TO NODE   1474.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.359
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8800
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    4.14
  TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =       7.68
  TC(MIN.) =   10.83
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1474.00 TO NODE   1475.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    90.20
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.68
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   11.83
  LONGEST FLOWPATH FROM NODE   1470.00 TO NODE   1475.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1475.00 TO NODE   1475.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.249
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8800
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.86
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      10.29
  TC(MIN.) =   11.83

****************************************************************************
  FLOW PROCESS FROM NODE   1475.00 TO NODE   1475.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    80.75
  FLOW LENGTH(FEET) =   385.00   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.) =  12.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.29
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   12.35
  LONGEST FLOWPATH FROM NODE   1470.00 TO NODE   1475.50 =    2295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1475.50 TO NODE   1475.50 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.) =   12.35
  RAINFALL INTENSITY(INCH/HR) =   3.19
  TOTAL STREAM AREA(ACRES) =     3.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.29
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    398.00 TO NODE   1475.50 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  11.85   RAIN INTENSITY(INCH/HOUR) =  3.25
  TOTAL AREA(ACRES) =    29.70   TOTAL RUNOFF(CFS) =     79.44

****************************************************************************
  FLOW PROCESS FROM NODE   1475.50 TO NODE   1475.50 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.) =   11.85
  RAINFALL INTENSITY(INCH/HR) =   3.25
  TOTAL STREAM AREA(ACRES) =    29.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     79.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.29    12.35        3.192          3.60
      2       79.44    11.85        3.247         29.70

  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       89.32    11.85       3.247
      2       88.39    12.35       3.192

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      89.32   Tc(MIN.) =   11.85
  TOTAL AREA(ACRES) =       33.3
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1475.50 =    3410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1475.50 TO NODE   1476.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    92.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.01
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      89.32
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   11.97
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1476.00 =    3560.00 FEET.

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

```
 FLOW PROCESS FROM NODE   1476.00 TO NODE   1476.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.233
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8310
 SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.99
 TOTAL AREA(ACRES) =       34.0   TOTAL RUNOFF(CFS) =      91.35
 TC(MIN.) =   11.97

****************************************************************************
 FLOW PROCESS FROM NODE   1476.00 TO NODE   1476.00 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.) =   11.97
 RAINFALL INTENSITY(INCH/HR) =   3.23
 TOTAL STREAM AREA(ACRES) =    34.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     91.35

****************************************************************************
 FLOW PROCESS FROM NODE    399.00 TO NODE   1476.10 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  10.31   RAIN INTENSITY(INCH/HOUR) =  3.42
 TOTAL AREA(ACRES) =     7.20   TOTAL RUNOFF(CFS) =     19.81

****************************************************************************
 FLOW PROCESS FROM NODE   1476.10 TO NODE   1476.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.416
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8146
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    3.01
 TOTAL AREA(ACRES) =        8.2   TOTAL RUNOFF(CFS) =      22.82
 TC(MIN.) =   10.31

****************************************************************************
 FLOW PROCESS FROM NODE   1476.10 TO NODE   1476.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.63
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.82
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.35
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1476.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1476.00 TO NODE   1476.00 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.) =   10.35
  RAINFALL INTENSITY(INCH/HR) =   3.41
  TOTAL STREAM AREA(ACRES) =     8.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.82

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       91.35    11.97        3.233         34.00
      2       22.82    10.35        3.412          8.20

  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      109.40    10.35       3.412
      2      112.98    11.97       3.233

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     112.98   Tc(MIN.) =   11.97
  TOTAL AREA(ACRES) =       42.2
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1476.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1476.00 TO NODE   1477.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    80.00
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.27
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.98
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   12.27
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1477.00 =    3960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1477.00 TO NODE   1477.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.200
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8289
 SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.53
 TOTAL AREA(ACRES) =       43.1   TOTAL RUNOFF(CFS) =     114.34
 TC(MIN.) =   12.27

****************************************************************************
 FLOW PROCESS FROM NODE   1477.00 TO NODE   1478.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    77.50
 FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.32
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     114.34
 PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   12.60
 LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1478.00 =    4410.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1478.00 TO NODE   1478.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.164
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8296
 SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.67
 TOTAL AREA(ACRES) =       43.7   TOTAL RUNOFF(CFS) =     114.69
 TC(MIN.) =   12.60

****************************************************************************
 FLOW PROCESS FROM NODE   1478.00 TO NODE   1479.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.25
 FLOW LENGTH(FEET) =   475.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.33
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     114.69
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   12.96
 LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1479.00 =    4885.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1479.00 TO NODE   1479.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.125
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8302
 SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.37
 TOTAL AREA(ACRES) =       44.2   TOTAL RUNOFF(CFS) =     114.69
 TC(MIN.) =   12.96
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE   1479.00 TO NODE   1480.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.25
 FLOW LENGTH(FEET) =   475.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.33
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     114.69
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   13.31
 LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1480.00 =    5360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1480.00 TO NODE   1480.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.086
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8307
 SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.36
 TOTAL AREA(ACRES) =       44.7   TOTAL RUNOFF(CFS) =     114.69
 TC(MIN.) =   13.31
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE   1480.00 TO NODE   1481.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.25
 FLOW LENGTH(FEET) =   475.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.33
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     114.69
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   13.67
 LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1481.00 =    5835.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1481.00 TO NODE   1481.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.047
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8313
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.34
  TOTAL AREA(ACRES) =       45.2   TOTAL RUNOFF(CFS) =     114.69
  TC(MIN.) =   13.67
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE   1481.00 TO NODE   1482.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.25
  FLOW LENGTH(FEET) =   475.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.69
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   14.02
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1482.00 =    6310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1482.00 TO NODE   1482.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.008
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8318
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.32
  TOTAL AREA(ACRES) =       45.7   TOTAL RUNOFF(CFS) =     114.69
  TC(MIN.) =   14.02
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE   1482.00 TO NODE   1483.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.69
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   14.38
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1483.00 =    6790.00 FEET.

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

```
  FLOW PROCESS FROM NODE   1483.00 TO NODE   1483.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.968
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8323
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.31
  TOTAL AREA(ACRES) =       46.2   TOTAL RUNOFF(CFS) =     114.69
  TC(MIN.) =   14.38
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE   1483.00 TO NODE   1484.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    82.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.69
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   14.64
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1484.00 =    7140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1484.00 TO NODE   1484.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.939
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8325
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.52
  TOTAL AREA(ACRES) =       46.4   TOTAL RUNOFF(CFS) =     114.69
  TC(MIN.) =   14.64
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE   1484.00 TO NODE   1485.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    87.50
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.69
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   14.83
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1485.00 =    7390.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1485.00 TO NODE   1485.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.919
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8329
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.03
  TOTAL AREA(ACRES) =       46.8   TOTAL RUNOFF(CFS) =     114.69
  TC(MIN.) =   14.83
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE   1485.00 TO NODE   1495.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     95.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.840
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     115.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.46
  AVERAGE FLOW DEPTH(FEET) =   1.37   TRAVEL TIME(MIN.) =   0.92
  Tc(MIN.) =   15.74
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    2.30
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.819
  TOTAL AREA(ACRES) =       48.6         PEAK FLOW RATE(CFS) =     114.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   5.45
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1495.00 =    7690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1495.00 TO NODE   1495.00 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.) =   15.74
  RAINFALL INTENSITY(INCH/HR) =   2.84
  TOTAL STREAM AREA(ACRES) =    48.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    114.69

****************************************************************************
  FLOW PROCESS FROM NODE   1490.00 TO NODE   1490.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  SUBAREA RUNOFF(CFS) =      1.55
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.55

****************************************************************************
  FLOW PROCESS FROM NODE   1490.00 TO NODE   1491.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    97.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.55
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.11
  LONGEST FLOWPATH FROM NODE   1490.00 TO NODE   1491.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1491.00 TO NODE   1491.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.378
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8800
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.77
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.31
  TC(MIN.) =    5.11

****************************************************************************
  FLOW PROCESS FROM NODE   1491.00 TO NODE   1495.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    93.75
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.31
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.37
  LONGEST FLOWPATH FROM NODE   1490.00 TO NODE   1495.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1495.00 TO NODE   1495.00 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.) =    5.37
  RAINFALL INTENSITY(INCH/HR) =   4.33
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      114.69    15.74        2.840         48.60
      2        2.31     5.37        4.330          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       77.55     5.37       4.330
      2      116.20    15.74       2.840

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     116.20   Tc(MIN.) =   15.74
  TOTAL AREA(ACRES) =       49.2
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1495.00 =    7690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1495.00 TO NODE   1496.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.60
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.20
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     116.20
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   15.80
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1496.00 =    7730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1496.00 TO NODE   1496.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.836
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7963
  SUBAREA AREA(ACRES) =    3.30   SUBAREA RUNOFF(CFS) =    4.21
  TOTAL AREA(ACRES) =       52.5   TOTAL RUNOFF(CFS) =     118.56
  TC(MIN.) =   15.80
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1496.00 TO NODE   1499.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.35
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.24
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     118.56
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   16.02
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1499.00 =    7895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1499.00 TO NODE   1499.00 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      118.56    16.02       2.818       52.50
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1499.00 =    7895.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      326.58    22.92       2.325      285.10
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1499.00 =    7925.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     346.89      16.02        2.818
      2     424.39      22.92        2.325

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     424.39   Tc(MIN.) =   22.92
  TOTAL AREA(ACRES) =      337.6

****************************************************************************
  FLOW PROCESS FROM NODE   1499.00 TO NODE   1499.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.325
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5337
  SUBAREA AREA(ACRES) =    8.50   SUBAREA RUNOFF(CFS) =    8.89
  TOTAL AREA(ACRES) =      346.1   TOTAL RUNOFF(CFS) =     429.44
  TC(MIN.) =   22.92
============================================================================
```

```
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      346.1  TC(MIN.) =     22.92
  PEAK FLOW RATE(CFS)   =     429.44
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Modified Rational Method Output
[Post-project Detained]

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2003 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                             San Diego, California 92110
                           619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* J-15013C SOUTHWEST VILLAGE                                             *
* 100-YEAR, 6-HOUR STORM EVENT                                           *
* BASIN 100 POST-PROJECT DETAINED                                        *
 **************************************************************************

  FILE NAME: S101HD00.RAT
  TIME/DATE OF STUDY: 17:43 07/06/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
```

```
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    533.00
  DOWNSTREAM ELEVATION(FEET) =    532.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.206
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.601
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    532.00  DOWNSTREAM(FEET) =    504.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   629.00   CHANNEL SLOPE =  0.0445
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.214
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.56
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   2.94
  Tc(MIN.) =  12.15
  SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =    9.69
  TOTAL AREA(ACRES) =      6.80         PEAK FLOW RATE(CFS) =       9.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   4.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =   704.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    504.00  DOWNSTREAM(FEET) =    478.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   332.00   CHANNEL SLOPE =  0.0783
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.121
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.59
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   0.84
  Tc(MIN.) =  12.99
  SUBAREA AREA(ACRES) =     1.00       SUBAREA RUNOFF(CFS) =    1.40
  TOTAL AREA(ACRES) =      7.80         PEAK FLOW RATE(CFS) =      11.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.35   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =  1036.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    472.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   145.00   CHANNEL SLOPE =  0.0414
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.069
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.08
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   0.48
  Tc(MIN.) =  13.46
  SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =      8.30         PEAK FLOW RATE(CFS) =      11.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.35   FLOW VELOCITY(FEET/SEC.) =   5.09
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =  1181.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    170.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   127.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     11.95
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =  13.79
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    170.00 =  1308.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 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.) =  13.79
  RAINFALL INTENSITY(INCH/HR) =   3.03
  TOTAL STREAM AREA(ACRES) =     8.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.95

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.00
  UPSTREAM ELEVATION(FEET) =    503.00
  DOWNSTREAM ELEVATION(FEET) =    498.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.441
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.126
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.00  DOWNSTREAM(FEET) =    474.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    98.00   CHANNEL SLOPE =  0.2449
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.969
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.97
  AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =   0.83
  Tc(MIN.) =   7.27
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =      0.30         PEAK FLOW RATE(CFS) =       0.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.02   FLOW VELOCITY(FEET/SEC.) =   2.65
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =   191.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    127.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   331.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.51
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      0.54
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   9.46
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =   522.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.552
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.64
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    1.18
  TC(MIN.) =   9.46
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    170.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.27
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.18
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   9.75
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    170.00 =   594.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 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.) =   9.75
  RAINFALL INTENSITY(INCH/HR) =   3.50
  TOTAL STREAM AREA(ACRES) =     0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.18

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    94.00
  UPSTREAM ELEVATION(FEET) =    492.00
  DOWNSTREAM ELEVATION(FEET) =    491.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.564
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    135.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  491.00  DOWNSTREAM ELEVATION(FEET) =  489.50
  STREET LENGTH(FEET) =   341.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    5.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    0.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.20
  STREET FLOW TRAVEL TIME(MIN.) =   6.26   Tc(MIN.) =  12.26
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.202
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.61
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.55
  FLOW VELOCITY(FEET/SEC.) =  0.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.23
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    135.00 =   435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    135.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.202
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    2.78
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =    3.79
  TC(MIN.) =  12.26

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    140.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =     3.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.94
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.79
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =  12.26
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    140.00 =   438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.201
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.05
  TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =    5.84
  TC(MIN.) =  12.26

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    150.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   482.50
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.84
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =  12.61
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    150.00 =   578.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.47
  TOTAL AREA(ACRES) =      2.40   TOTAL RUNOFF(CFS) =    6.31
```

```
  TC(MIN.) =  12.61

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    3.49
  TOTAL AREA(ACRES) =      3.70   TOTAL RUNOFF(CFS) =    9.81
  TC(MIN.) =  12.61

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    160.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.50  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.07
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.81
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  12.67
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    160.00 =   608.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.156
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =      4.50   TOTAL RUNOFF(CFS) =   11.83
  TC(MIN.) =  12.67

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.156
  *USER SPECIFIED(SUBAREA):
```

```
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =      5.40   TOTAL RUNOFF(CFS) =   14.21
  TC(MIN.) =  12.67

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    170.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.27
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     14.21
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  12.79
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    170.00 =   733.00 FEET.

+----------------------------------------------------------------------------+
| Q100 = 3.4CFS ; T_C = 23.6 MIN ; A = 5.4 AC                                |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  23.60   RAIN INTENSITY(INCH/HOUR) =  2.28
  TOTAL AREA(ACRES) =     5.40   TOTAL RUNOFF(CFS) =      3.40

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 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.) =  23.60
  RAINFALL INTENSITY(INCH/HR) =   2.28
  TOTAL STREAM AREA(ACRES) =     5.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.40

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.95    13.79        3.033          8.30
      2        1.18     9.75        3.498          0.70
      3        3.40    23.60        2.284          5.40

  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       13.76     9.75       3.498
      2       15.53    13.79       3.033
      3       13.17    23.60       2.284

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     15.53   Tc(MIN.) =   13.79
  TOTAL AREA(ACRES) =     14.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    170.00 =  1308.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.033
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.55
  TOTAL AREA(ACRES) =     14.80   TOTAL RUNOFF(CFS) =   16.08
  TC(MIN.) =  13.79

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.033
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.55
  TOTAL AREA(ACRES) =     15.20   TOTAL RUNOFF(CFS) =   16.62
  TC(MIN.) =  13.79

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    180.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   172.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.70
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     16.62
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  13.90
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    180.00 =  1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    180.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.021
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    1.09
  TOTAL AREA(ACRES) =     16.00   TOTAL RUNOFF(CFS) =   17.71
  TC(MIN.) =  13.90

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    180.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.021
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =     16.50   TOTAL RUNOFF(CFS) =   18.39
  TC(MIN.) =  13.90
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     16.50  TC(MIN.) =     13.90
  PEAK FLOW RATE(CFS)   =     18.39
============================================================================
============================================================================
  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 1982-2003 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                              Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* J-15013C SOUTHWEST VILLAGE                                             *
* 100-YEAR, 6-HOUR STORM EVENT / C=0.45 FOR OFFSITE AREAS                *
* BASIN 200 POST PROJECT DETAINED                                        *
 **************************************************************************

  FILE NAME: S102HD00.RAT
  TIME/DATE OF STUDY: 17:49 07/06/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
```

```
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
  3   11.0      6.0    0.020/0.018/0.020   0.50    1.50 0.0313 0.125 0.0130

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    520.00
  DOWNSTREAM ELEVATION(FEET) =    519.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.971
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  519.50  DOWNSTREAM ELEVATION(FEET) =  486.00
  STREET LENGTH(FEET) =   704.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  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) =   0.0180
  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) =  0.26
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    7.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   3.38   Tc(MIN.) =   9.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.567
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    3.72
  TOTAL AREA(ACRES) =      1.30        PEAK FLOW RATE(CFS) =       4.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.78
  FLOW VELOCITY(FEET/SEC.) =  3.96   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =   789.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    230.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =   347.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.38
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.12
  PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =  10.70
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =  1136.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    510.00
  DOWNSTREAM ELEVATION(FEET) =    509.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.171
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.797
 SUBAREA RUNOFF(CFS) =      0.17
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    496.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   123.00   CHANNEL SLOPE =  0.1057
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.521
 *USER SPECIFIED(SUBAREA):
 RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.49
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.41
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   1.46
 Tc(MIN.) =   9.63
 SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.63
 TOTAL AREA(ACRES) =      0.50         PEAK FLOW RATE(CFS) =       0.80

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.87
 LONGEST FLOWPATH FROM NODE    205.00 TO NODE    207.00 =   188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    207.00 TO NODE    209.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  496.00  DOWNSTREAM ELEVATION(FEET) =  494.00
 STREET LENGTH(FEET) =   123.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 11.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.200
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.200

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    2.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =  10.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.413
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       1.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   2.15
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    209.00 =   311.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.413
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    1.40
  TC(MIN.) =  10.34

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.413
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.55
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =    1.95
  TC(MIN.) =  10.34

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   490.50
```

```
  FLOW LENGTH(FEET) =    67.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.94
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.95
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =  10.62
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    210.00 =   378.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.381
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.44
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =    3.39
  TC(MIN.) =  10.62

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    212.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   490.50  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.19
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.39
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =  11.54
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    212.00 =   553.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.281
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.10
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    4.49
  TC(MIN.) =  11.54

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

```
 FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   489.50
 FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.32
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.49
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  11.59
 LONGEST FLOWPATH FROM NODE    205.00 TO NODE    215.00 =   576.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.84
 TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =    5.32
 TC(MIN.) =  11.59

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
 *USER SPECIFIED(SUBAREA):
 INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.31
 TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =    5.63
 TC(MIN.) =  11.59

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    217.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.50  DOWNSTREAM(FEET) =   488.00
 FLOW LENGTH(FEET) =   159.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
```

```
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.63
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =  12.06
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    217.00 =   735.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.224
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.22
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =    7.85
  TC(MIN.) =  12.06

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    228.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   487.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.80
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.85
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  12.13
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    228.00 =   775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    228.00 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.) =  12.13
  RAINFALL INTENSITY(INCH/HR) =   3.22
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.85

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    222.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    84.00
  UPSTREAM ELEVATION(FEET) =    498.00
  DOWNSTREAM ELEVATION(FEET) =    497.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.670
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.00  DOWNSTREAM ELEVATION(FEET) =  496.00
  STREET LENGTH(FEET) =    99.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 11.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =   6.92
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.036
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.23
  FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.42
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =   183.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    223.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.036
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =    1.01
  TC(MIN.) =   6.92

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    225.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.60
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.01
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   7.87
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =   388.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.855
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.30
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    2.31
  TC(MIN.) =   7.87

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    227.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   488.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.31
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   8.59
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    227.00 =   588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.717
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.90
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =    4.21
  TC(MIN.) =   8.59

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    228.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   487.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.21
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   9.23
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    228.00 =   758.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    228.00 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.) =   9.23
  RAINFALL INTENSITY(INCH/HR) =   3.60
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.21

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

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.85    12.13        3.215          3.00
      2        4.21     9.23        3.596          1.30

  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       11.23     9.23       3.596
      2       11.61    12.13       3.215

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     11.61   Tc(MIN.) =   12.13
  TOTAL AREA(ACRES) =      4.30
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    228.00 =   775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    229.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     11.61
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.23
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    229.00 =   838.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    229.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.204
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.30
  TOTAL AREA(ACRES) =      4.40   TOTAL RUNOFF(CFS) =   11.92
  TC(MIN.) =  12.23

****************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    229.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.204
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.22
  TOTAL AREA(ACRES) =      4.80   TOTAL RUNOFF(CFS) =   13.13
  TC(MIN.) =  12.23

**************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    230.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.87
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     13.13
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  12.34
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    230.00 =   921.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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       13.13    12.34        3.193        4.80
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    230.00 =   921.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.12    10.70        3.373        1.30
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =  1136.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      16.56      10.70        3.373
      2      17.04      12.34        3.193

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     17.04   Tc(MIN.) =   12.34
```

```
  TOTAL AREA(ACRES) =      6.10

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    235.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.42
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     17.04
  PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =  13.82
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    235.00 =  1616.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.030
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.73
  TOTAL AREA(ACRES) =      6.70   TOTAL RUNOFF(CFS) =   18.77
  TC(MIN.) =  13.82

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.030
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.59
  TOTAL AREA(ACRES) =      7.60   TOTAL RUNOFF(CFS) =   21.36
  TC(MIN.) =  13.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    268.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.14
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     21.36
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  13.88
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    268.00 =  1651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    268.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    241.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    73.00
  UPSTREAM ELEVATION(FEET) =    494.00
  DOWNSTREAM ELEVATION(FEET) =    493.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.539
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    494.00  DOWNSTREAM(FEET) =    490.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.968
```

```
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.18
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.27
  Tc(MIN.) =   7.27
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =      0.20         PEAK FLOW RATE(CFS) =       0.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    242.00 =   163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    247.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  493.00  DOWNSTREAM ELEVATION(FEET) =  492.00
  STREET LENGTH(FEET) =    84.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  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) =   0.0180
  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) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    6.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =   8.16
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       0.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.85
  FLOW VELOCITY(FEET/SEC.) =  1.65   DEPTH*VELOCITY(FT*FT/SEC.) =   0.40
```

```
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    247.00 =   247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    247.00 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.) =   8.16
  RAINFALL INTENSITY(INCH/HR) =   3.80
  TOTAL STREAM AREA(ACRES) =     0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    245.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    492.00
  DOWNSTREAM ELEVATION(FEET) =    491.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.249
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    246.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  491.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   118.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 11.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =   7.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.988
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.38
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.52
  FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.41
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    246.00 =   193.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    246.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.988
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.66
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    2.37
  TC(MIN.) =   7.17

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    247.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   486.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.11
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.37
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   7.74
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    247.00 =   333.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    247.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.880
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    3.54
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    5.91
  TC(MIN.) =   7.74

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    247.00 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.) =   7.74
  RAINFALL INTENSITY(INCH/HR) =   3.88
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.91

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.91     8.16        3.800          0.30
      2        5.91     7.74        3.880          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        6.81     7.74       3.880
      2        6.71     8.16       3.800

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      6.81   Tc(MIN.) =    7.74
  TOTAL AREA(ACRES) =      2.10
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    247.00 =   333.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    249.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      6.81
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   8.56
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    249.00 =   603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.85
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =    9.66
  TC(MIN.) =   8.56

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    254.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =   239.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.66
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   9.20
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    254.00 =   842.00 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.) =   9.20
  RAINFALL INTENSITY(INCH/HR) =   3.60
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.66

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

```
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    87.00
 UPSTREAM ELEVATION(FEET) =    490.00
 DOWNSTREAM ELEVATION(FEET) =    489.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.808
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.34
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
 FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  488.50
 STREET LENGTH(FEET) =   213.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 11.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.98
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.70
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.14
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.34
 STREET FLOW TRAVEL TIME(MIN.) =   3.10   Tc(MIN.) =   9.10
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.27
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.61
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.77
  FLOW VELOCITY(FEET/SEC.) =  1.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =   300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.38
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =    2.99
  TC(MIN.) =   9.10

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    253.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.50  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.08
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.99
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =  10.09
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    253.00 =   600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    253.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.440
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .7400
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.29
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    5.28
  TC(MIN.) =  10.09

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    254.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.28
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  10.14
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    254.00 =   637.00 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.) =  10.14
  RAINFALL INTENSITY(INCH/HR) =   3.43
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.66     9.20        3.602          3.00
      2        5.28    10.14        3.435          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       14.69     9.20       3.602
      2       14.49    10.14       3.435

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     14.69   Tc(MIN.) =    9.20
  TOTAL AREA(ACRES) =      4.80
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    254.00 =   842.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    255.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   481.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     14.69
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   9.33
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    255.00 =   897.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    255.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.577
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =      5.00   TOTAL RUNOFF(CFS) =   15.37
  TC(MIN.) =   9.33

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    260.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.50  DOWNSTREAM(FEET) =   481.25
  FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.18
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     15.37
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.35
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    260.00 =   908.00 FEET.

****************************************************************************
  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.) =   9.35
  RAINFALL INTENSITY(INCH/HR) =   3.57
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.37

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

```
 FLOW PROCESS FROM NODE    256.00 TO NODE    257.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
 UPSTREAM ELEVATION(FEET) =    491.00
 DOWNSTREAM ELEVATION(FEET) =    490.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.458
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.74
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
 FLOW PROCESS FROM NODE    257.00 TO NODE    258.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   485.00
 FLOW LENGTH(FEET) =   288.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.91
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.74
 PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   7.65
 LONGEST FLOWPATH FROM NODE    256.00 TO NODE    258.00 =   373.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.897
 *USER SPECIFIED(SUBAREA):
 MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8400
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.62
 TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =    3.36
 TC(MIN.) =   7.65

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    259.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.36
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   7.71
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    259.00 =   398.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    259.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.885
  *USER SPECIFIED(SUBAREA):
  MULTI-UNITS DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =    4.35
  TC(MIN.) =   7.71

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    260.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   481.25
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.32
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.35
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   7.90
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    260.00 =   493.00 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.) =   7.90
  RAINFALL INTENSITY(INCH/HR) =   3.85
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.35
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       15.37     9.35        3.574          5.00
      2        4.35     7.90        3.849          1.30

  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       18.62     7.90       3.849
      2       19.41     9.35       3.574

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     19.41   Tc(MIN.) =    9.35
  TOTAL AREA(ACRES) =      6.30
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    260.00 =   908.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    261.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.25  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     19.41
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   9.47
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    261.00 =   953.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.551
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =      6.40   TOTAL RUNOFF(CFS) =   19.75
  TC(MIN.) =   9.47
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.551
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =      6.50   TOTAL RUNOFF(CFS) =   20.08
  TC(MIN.) =   9.47

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    265.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   479.00
  FLOW LENGTH(FEET) =   203.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.95
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     20.08
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   9.90
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    265.00 =  1156.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.470
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    3.63
  TOTAL AREA(ACRES) =      7.60   TOTAL RUNOFF(CFS) =   23.71
  TC(MIN.) =   9.90

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    268.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  13.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.47
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     23.71
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  10.02
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    268.00 =  1226.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    268.00 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       23.71    10.02        3.448        7.60
  LONGEST FLOWPATH FROM NODE    243.00 TO NODE    268.00 =  1226.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1       21.36    13.88        3.023        7.60
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    268.00 =  1651.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      42.44      10.02        3.448
      2      42.15      13.88        3.023

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     42.44   Tc(MIN.) =   10.02
  TOTAL AREA(ACRES) =     15.20

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    268.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    269.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   475.00
  FLOW LENGTH(FEET) =   474.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
```

```
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     42.44
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =  11.01
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    269.00 =  2125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.339
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    3.17
  TOTAL AREA(ACRES) =     16.20   TOTAL RUNOFF(CFS) =   45.61
  TC(MIN.) =  11.01

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    287.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.72
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     45.61
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =  11.45
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    287.00 =  2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    271.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.00
  UPSTREAM ELEVATION(FEET) =    496.00
  DOWNSTREAM ELEVATION(FEET) =    495.00
```

```
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.393
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    271.00 TO NODE    272.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  495.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   134.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.17
    HALFSTREET FLOOD WIDTH(FEET) =    3.06
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.38
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =   6.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.026
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.19   HALFSTREET FLOOD WIDTH(FEET) =   4.32
  FLOW VELOCITY(FEET/SEC.) =  2.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.46
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    272.00 =   230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    272.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.026
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7300
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.18
TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =    2.50
TC(MIN.) =   6.97

****************************************************************************
FLOW PROCESS FROM NODE    272.00 TO NODE    273.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   485.00
FLOW LENGTH(FEET) =   257.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.29
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      2.50
PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   7.97
LONGEST FLOWPATH FROM NODE    270.00 TO NODE    273.00 =   487.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    273.00 TO NODE    273.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.836
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .6100
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.11
TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =    4.60
TC(MIN.) =   7.97

****************************************************************************
FLOW PROCESS FROM NODE    273.00 TO NODE    274.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
FLOW LENGTH(FEET) =   177.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.43
GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      4.60
PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   8.63
LONGEST FLOWPATH FROM NODE    270.00 TO NODE    274.00 =   664.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    274.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.710
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.67
  TOTAL AREA(ACRES) =      2.60   TOTAL RUNOFF(CFS) =    7.28
  TC(MIN.) =   8.63

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    275.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   141.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.28
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   9.06
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    275.00 =   805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    275.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.628
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.78
  TOTAL AREA(ACRES) =      3.20   TOTAL RUNOFF(CFS) =    9.06
  TC(MIN.) =   9.06

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    280.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    77.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.06
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   9.24
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    280.00 =   882.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    280.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.594
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =    9.64
  TC(MIN.) =   9.24

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    280.00 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.) =   9.24
  RAINFALL INTENSITY(INCH/HR) =   3.59
  TOTAL STREAM AREA(ACRES) =     3.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.64

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    277.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    98.00
  UPSTREAM ELEVATION(FEET) =    492.00
  DOWNSTREAM ELEVATION(FEET) =    491.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.487
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    278.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  491.00  DOWNSTREAM ELEVATION(FEET) =  489.00
  STREET LENGTH(FEET) =   169.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    4.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =   7.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.836
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.24
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   6.38
  FLOW VELOCITY(FEET/SEC.) =  1.60   DEPTH*VELOCITY(FT*FT/SEC.) =   0.37
  LONGEST FLOWPATH FROM NODE    276.00 TO NODE    278.00 =   267.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    278.00 TO NODE    278.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.836
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.52
  TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =    3.09
  TC(MIN.) =   7.97
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    278.00 TO NODE    280.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =   248.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.09
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   8.76
  LONGEST FLOWPATH FROM NODE    276.00 TO NODE    280.00 =   515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    280.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.685
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.36
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    5.45
  TC(MIN.) =   8.76

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    280.00 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.) =   8.76
  RAINFALL INTENSITY(INCH/HR) =   3.69
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.45

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.64     9.24        3.594          3.40
      2        5.45     8.76        3.685          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       14.85     8.76       3.685
      2       14.95     9.24       3.594

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     14.95   Tc(MIN.) =    9.24
  TOTAL AREA(ACRES) =      5.20
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    280.00 =   882.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    281.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.98
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     14.95
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.29
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    281.00 =   916.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    281.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.584
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.70
  TOTAL AREA(ACRES) =      5.80   TOTAL RUNOFF(CFS) =   16.65
  TC(MIN.) =   9.29

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    281.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.584
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.58
```

```
  TOTAL AREA(ACRES) =      6.70   TOTAL RUNOFF(CFS) =   19.23
  TC(MIN.) =   9.29

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    287.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   137.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.58
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     19.23
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   9.43
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    287.00 =  1053.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.558
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.80
  TOTAL AREA(ACRES) =      7.20   TOTAL RUNOFF(CFS) =   20.03
  TC(MIN.) =   9.43

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.558
  *USER SPECIFIED(SUBAREA):
  RURAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.80
  TOTAL AREA(ACRES) =      7.70   TOTAL RUNOFF(CFS) =   20.83
  TC(MIN.) =   9.43

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 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       20.83     9.43       3.558        7.70
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    287.00 =  1053.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1       45.61    11.45       3.291       16.20
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    287.00 =  2435.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      63.01       9.43        3.558
      2      64.87      11.45        3.291

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     64.87   Tc(MIN.) =   11.45
  TOTAL AREA(ACRES) =     23.90

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| Q100 = 27.6CFS ; T_C = 19.3 MIN ; A = 23.9 AC                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    287.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  19.30   RAIN INTENSITY(INCH/HOUR) =  2.56
  TOTAL AREA(ACRES) =    23.90   TOTAL RUNOFF(CFS) =     27.60

****************************************************************************
  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.) =  19.30
  RAINFALL INTENSITY(INCH/HR) =   2.56
  TOTAL STREAM AREA(ACRES) =    23.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.60

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    283.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.00
  UPSTREAM ELEVATION(FEET) =    492.00
  DOWNSTREAM ELEVATION(FEET) =    491.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.104
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    284.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    485.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1195.00   CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.72
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   7.31
  Tc(MIN.) =  16.41
  SUBAREA AREA(ACRES) =    12.30       SUBAREA RUNOFF(CFS) =   15.43
  TOTAL AREA(ACRES) =     12.40         PEAK FLOW RATE(CFS) =      15.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   3.28
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    284.00 =  1269.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    284.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    7.20   SUBAREA RUNOFF(CFS) =    9.03
  TOTAL AREA(ACRES) =     19.60   TOTAL RUNOFF(CFS) =   24.62
  TC(MIN.) =  16.41

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    285.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    485.00  DOWNSTREAM(FEET) =    480.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   671.00   CHANNEL SLOPE =  0.0075
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.636
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     29.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.93
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   1.89
  Tc(MIN.) =  18.30
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =    8.90
  TOTAL AREA(ACRES) =     27.10         PEAK FLOW RATE(CFS) =      33.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   6.17
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    285.00 =  1940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    285.00 TO NODE    285.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.636
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    9.70   SUBAREA RUNOFF(CFS) =   11.51
  TOTAL AREA(ACRES) =     36.80   TOTAL RUNOFF(CFS) =   45.02
  TC(MIN.) =  18.30

****************************************************************************
  FLOW PROCESS FROM NODE    285.00 TO NODE    287.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   590.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  22.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.46
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     45.02
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =  19.46
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    287.00 =  2530.00 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.) =  19.46
  RAINFALL INTENSITY(INCH/HR) =   2.54
  TOTAL STREAM AREA(ACRES) =    36.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.02

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       27.60    19.30        2.556         23.90
      2       45.02    19.46        2.543         36.80

  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       72.39    19.30       2.556
      2       72.48    19.46       2.543

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     72.48   Tc(MIN.) =   19.46
  TOTAL AREA(ACRES) =     60.70
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    287.00 =  2530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    290.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   390.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  44.49
  GIVEN PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     72.48
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  19.52
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    290.00 =  2690.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     60.70  TC(MIN.) =     19.52
  PEAK FLOW RATE(CFS)   =     72.48
============================================================================
============================================================================
  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 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                           San Diego, California 92110
                         619-291-0707   Fax 619-291-4165

 ************************ DESCRIPTION OF STUDY *************************
* J-15013C SOUTHWEST VILLAGE                                           *
* 100-YEAR, 6-HOUR STORM EVENT                                         *
* BASIN 1400 - BEYER BLVD POST PROJECT DETAINED                        *
 **********************************************************************

  FILE NAME: S1014D00.RAT
  TIME/DATE OF STUDY: 16:36 02/17/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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   1400.00 TO NODE   1401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.269
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.349
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE   1401.00 TO NODE   1402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   83.00
  STREET LENGTH(FEET) =   850.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   15.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   4.15   Tc(MIN.) =    9.42
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.560
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   32.64
  TOTAL AREA(ACRES) =       13.4        PEAK FLOW RATE(CFS) =      33.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  20.40
```

```
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.04
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  850.0 FT WITH ELEVATION-DROP =  17.0 FT, IS   39.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE   1402.00
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1402.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1402.00 TO NODE   1404.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     52.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00   CHANNEL SLOPE =  0.0500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.225
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      46.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.04
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   2.62
  Tc(MIN.) =   12.04
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   26.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.576
  TOTAL AREA(ACRES) =       30.7         PEAK FLOW RATE(CFS) =      57.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   6.46
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1404.00 =    1900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1404.00 TO NODE   1404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.225
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6085
  SUBAREA AREA(ACRES) =    5.20   SUBAREA RUNOFF(CFS) =   13.42
  TOTAL AREA(ACRES) =       35.9   TOTAL RUNOFF(CFS) =      70.45
  TC(MIN.) =   12.04

****************************************************************************
  FLOW PROCESS FROM NODE   1404.00 TO NODE   1405.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     43.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1415.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.859
  *USER SPECIFIED(SUBAREA):
```

```
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      86.19
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.79
  AVERAGE FLOW DEPTH(FEET) =   0.93   TRAVEL TIME(MIN.) =   3.47
  Tc(MIN.) =   15.51
  SUBAREA AREA(ACRES) =    24.40       SUBAREA RUNOFF(CFS) =   31.39
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.544
  TOTAL AREA(ACRES) =       60.3         PEAK FLOW RATE(CFS) =      93.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   7.01
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1405.00 =    3315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1405.00 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.) =   15.51
  RAINFALL INTENSITY(INCH/HR) =   2.86
  TOTAL STREAM AREA(ACRES) =    60.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     93.84

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    199.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  13.90   RAIN INTENSITY(INCH/HOUR) =  3.02
  TOTAL AREA(ACRES) =    16.50   TOTAL RUNOFF(CFS) =     18.40

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE   1405.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     70.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.782
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.85
  AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =   2.58
  Tc(MIN.) =   16.48
  SUBAREA AREA(ACRES) =    18.60       SUBAREA RUNOFF(CFS) =   23.28
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.412
  TOTAL AREA(ACRES) =       35.1         PEAK FLOW RATE(CFS) =      40.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   5.35
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE   1405.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1405.00 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.) =   16.48
  RAINFALL INTENSITY(INCH/HR) =   2.78
  TOTAL STREAM AREA(ACRES) =    35.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.22

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       93.84    15.51        2.859         60.30
      2       40.22    16.48        2.782         35.10

  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      131.71    15.51       2.859
      2      131.53    16.48       2.782

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     131.71   Tc(MIN.) =   15.51
  TOTAL AREA(ACRES) =       95.4
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1405.00 =    3315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1405.00 TO NODE   1410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     81.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   475.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.777
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     134.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.79
  AVERAGE FLOW DEPTH(FEET) =   1.18   TRAVEL TIME(MIN.) =   1.02
  Tc(MIN.) =   16.53
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    6.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.493
  TOTAL AREA(ACRES) =      100.5         PEAK FLOW RATE(CFS) =     137.71
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   7.81
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1410.00 =    3790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1410.00 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) =   2.78
  TOTAL STREAM AREA(ACRES) =   100.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    137.71

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE    299.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  19.50   RAIN INTENSITY(INCH/HOUR) =  2.54
  TOTAL AREA(ACRES) =    60.70   TOTAL RUNOFF(CFS) =     72.50

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE   1410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     58.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.373
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      82.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.69
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   2.62
  Tc(MIN.) =   22.12
  SUBAREA AREA(ACRES) =    18.20       SUBAREA RUNOFF(CFS) =   19.43
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.466
  TOTAL AREA(ACRES) =       78.9         PEAK FLOW RATE(CFS) =      87.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.93   FLOW VELOCITY(FEET/SEC.) =   6.85
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE   1410.00 =    1800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1410.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.12
  RAINFALL INTENSITY(INCH/HR) =   2.37
  TOTAL STREAM AREA(ACRES) =    78.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     87.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)      (MIN.)   (INCH/HOUR)    (ACRE)
      1      137.71    16.53         2.777        100.50
      2       87.17    22.12         2.373         78.90

  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      202.86    16.53        2.777
      2      204.82    22.12        2.373

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     204.82   Tc(MIN.) =   22.12
  TOTAL AREA(ACRES) =      179.4
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1410.00 =    3790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1410.00 TO NODE   1420.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     60.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.260
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     212.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.89
  AVERAGE FLOW DEPTH(FEET) =   1.50   TRAVEL TIME(MIN.) =   1.88
  Tc(MIN.) =   23.99
  SUBAREA AREA(ACRES) =    16.00       SUBAREA RUNOFF(CFS) =   16.28
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.479
  TOTAL AREA(ACRES) =      195.4         PEAK FLOW RATE(CFS) =     211.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.49   FLOW VELOCITY(FEET/SEC.) =   8.87
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1420.00 =    4790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1420.00 TO NODE   1420.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   23.99
  RAINFALL INTENSITY(INCH/HR) =   2.26
  TOTAL STREAM AREA(ACRES) =   195.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    211.39

****************************************************************************
  FLOW PROCESS FROM NODE   1416.00 TO NODE   1417.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE   1417.00 TO NODE   1418.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     54.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   760.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.336
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.12
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   2.47
  Tc(MIN.) =   11.03
  SUBAREA AREA(ACRES) =     1.40       SUBAREA RUNOFF(CFS) =    2.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       2.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   6.31
  LONGEST FLOWPATH FROM NODE   1416.00 TO NODE   1418.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1418.00 TO NODE   1420.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     51.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   490.00   CHANNEL SLOPE =  0.1000
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.043
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.06
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   2.67
  Tc(MIN.) =   13.70
  SUBAREA AREA(ACRES) =     2.20       SUBAREA RUNOFF(CFS) =    3.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       5.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   3.42
  LONGEST FLOWPATH FROM NODE   1416.00 TO NODE   1420.00 =    1350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1420.00 TO NODE   1420.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.70
  RAINFALL INTENSITY(INCH/HR) =   3.04
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      211.39    23.99        2.260        195.40
      2        5.07    13.70        3.043          3.70

  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      162.10    13.70       3.043
      2      215.15    23.99       2.260

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     215.15   Tc(MIN.) =   23.99
  TOTAL AREA(ACRES) =      199.1
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1420.00 =    4790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1420.00 TO NODE   1430.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =      0.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2500.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.060
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     245.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.26
  AVERAGE FLOW DEPTH(FEET) =   1.61   TRAVEL TIME(MIN.) =   4.50
  Tc(MIN.) =   28.49
  SUBAREA AREA(ACRES) =    66.00       SUBAREA RUNOFF(CFS) =   61.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.471
  TOTAL AREA(ACRES) =      265.1         PEAK FLOW RATE(CFS) =     257.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.65   FLOW VELOCITY(FEET/SEC.) =   9.39
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1430.00 =    7290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1430.00 TO NODE   1430.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   28.49
  RAINFALL INTENSITY(INCH/HR) =   2.06
  TOTAL STREAM AREA(ACRES) =   265.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    257.30

****************************************************************************
  FLOW PROCESS FROM NODE   1427.00 TO NODE   1428.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE   1428.00 TO NODE   1429.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    200.00  DOWNSTREAM(FEET) =     56.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2400.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.020
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.49
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   5.34
  Tc(MIN.) =   13.91
  SUBAREA AREA(ACRES) =     4.80       SUBAREA RUNOFF(CFS) =    6.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        4.9         PEAK FLOW RATE(CFS) =       6.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   9.36
  LONGEST FLOWPATH FROM NODE   1427.00 TO NODE   1429.00 =    2500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1429.00 TO NODE   1430.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    96.25
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.66
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   14.02
  LONGEST FLOWPATH FROM NODE   1427.00 TO NODE   1430.00 =    2575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1430.00 TO NODE   1430.00 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.) =   14.02
  RAINFALL INTENSITY(INCH/HR) =   3.01
  TOTAL STREAM AREA(ACRES) =     4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.66

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      257.30    28.49        2.060        265.10
      2        6.66    14.02        3.008          4.90
```

```
  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      182.91    14.02       3.008
      2      261.86    28.49       2.060

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     261.86   Tc(MIN.) =   28.49
  TOTAL AREA(ACRES) =      270.0
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1430.00 =    7290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1430.00 TO NODE   1498.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.96
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     261.86
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   28.55
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1498.00 =    7355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1498.00 TO NODE   1498.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   28.55
  RAINFALL INTENSITY(INCH/HR) =   2.06
  TOTAL STREAM AREA(ACRES) =   270.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    261.86

****************************************************************************
  FLOW PROCESS FROM NODE   1450.00 TO NODE   1451.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     98.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.723
SUBAREA RUNOFF(CFS) =      0.17
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
FLOW PROCESS FROM NODE   1451.00 TO NODE   1453.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     43.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00   CHANNEL SLOPE =  0.0600
CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   4.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.319
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.03
AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   2.63
Tc(MIN.) =   11.19
SUBAREA AREA(ACRES) =     2.40       SUBAREA RUNOFF(CFS) =    3.58
AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
TOTAL AREA(ACRES) =        2.5         PEAK FLOW RATE(CFS) =       3.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   7.74
LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1453.00 =    1050.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   1453.00 TO NODE   1453.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.319
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
SUBAREA AREA(ACRES) =    2.30   SUBAREA RUNOFF(CFS) =    3.44
TOTAL AREA(ACRES) =        4.8   TOTAL RUNOFF(CFS) =       7.17
TC(MIN.) =   11.19

****************************************************************************
FLOW PROCESS FROM NODE   1453.00 TO NODE   1454.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     25.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1250.00   CHANNEL SLOPE =  0.0600
CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   4.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.101
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.49
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.99
  Tc(MIN.) =   13.17
  SUBAREA AREA(ACRES) =     3.40       SUBAREA RUNOFF(CFS) =    4.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        8.2         PEAK FLOW RATE(CFS) =      11.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =  11.09
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1454.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1454.00 TO NODE   1454.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.101
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    6.84
  TOTAL AREA(ACRES) =       13.1   TOTAL RUNOFF(CFS) =      18.28
  TC(MIN.) =   13.17

****************************************************************************
  FLOW PROCESS FROM NODE   1454.00 TO NODE   1455.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     37.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.952
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.94
  AVERAGE FLOW DEPTH(FEET) =   0.75   TRAVEL TIME(MIN.) =   1.35
  Tc(MIN.) =   14.53
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    2.39
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =       14.9         PEAK FLOW RATE(CFS) =      19.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.76   FLOW VELOCITY(FEET/SEC.) =  13.02
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1455.00 =    3350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1455.00 TO NODE   1455.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.952
```

```
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4500
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =       15.1   TOTAL RUNOFF(CFS) =      20.06
  TC(MIN.) =   14.53

****************************************************************************
  FLOW PROCESS FROM NODE   1455.00 TO NODE   1498.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    71.50
  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   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.06
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   14.56
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1498.00 =    3410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1498.00 TO NODE   1498.00 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.) =   14.56
  RAINFALL INTENSITY(INCH/HR) =   2.95
  TOTAL STREAM AREA(ACRES) =    15.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.06

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      261.86    28.55        2.058        270.00
      2       20.06    14.56        2.949         15.10

  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      202.82    14.56       2.949
      2      275.86    28.55       2.058

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     275.86   Tc(MIN.) =   28.55
  TOTAL AREA(ACRES) =      285.1
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1498.00 =    7355.00 FEET.

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

```
 FLOW PROCESS FROM NODE   1498.00 TO NODE   1499.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    71.50
 FLOW LENGTH(FEET) =   570.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  27.52
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     275.86
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   28.89
 LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1499.00 =    7925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1499.00 TO NODE   1499.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1470.00 TO NODE   1471.00 IS CODE =  22
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 USER SPECIFIED Tc(MIN.) =    5.000
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 SUBAREA RUNOFF(CFS) =      0.39
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
 FLOW PROCESS FROM NODE   1471.00 TO NODE   1472.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   84.50
 STREET LENGTH(FEET) =   775.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 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) =   0.0180
 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) =    7.78
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   5.64   Tc(MIN.) =   10.64
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.379
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.880
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.38
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.78
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE   1470.00 TO NODE   1472.00 =    1345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1472.00 TO NODE   1472.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.379
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8800
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.89
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.57
  TC(MIN.) =   10.64

****************************************************************************
  FLOW PROCESS FROM NODE   1472.00 TO NODE   1474.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.57
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE   1470.00 TO NODE   1474.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1474.00 TO NODE   1474.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.359
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8800
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    4.14
  TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =       7.68
  TC(MIN.) =   10.83
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1474.00 TO NODE   1475.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    90.20
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.68
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   11.83
  LONGEST FLOWPATH FROM NODE   1470.00 TO NODE   1475.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1475.00 TO NODE   1475.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.249
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8800
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.86
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      10.29
  TC(MIN.) =   11.83

****************************************************************************
  FLOW PROCESS FROM NODE   1475.00 TO NODE   1475.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    80.75
  FLOW LENGTH(FEET) =   385.00   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.) =  12.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.29
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   12.35
  LONGEST FLOWPATH FROM NODE   1470.00 TO NODE   1475.50 =    2295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1475.50 TO NODE   1475.50 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.) =   12.35
  RAINFALL INTENSITY(INCH/HR) =   3.19
  TOTAL STREAM AREA(ACRES) =     3.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.29
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    398.00 TO NODE   1475.50 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.90   RAIN INTENSITY(INCH/HOUR) =  2.59
  TOTAL AREA(ACRES) =    36.90   TOTAL RUNOFF(CFS) =     46.00

****************************************************************************
  FLOW PROCESS FROM NODE   1475.50 TO NODE   1475.50 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.) =   18.90
  RAINFALL INTENSITY(INCH/HR) =   2.59
  TOTAL STREAM AREA(ACRES) =    36.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     46.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.29    12.35        3.192          3.60
      2       46.00    18.90        2.588         36.90

  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       40.35    12.35       3.192
      2       54.35    18.90       2.588

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.35   Tc(MIN.) =   18.90
  TOTAL AREA(ACRES) =       40.5
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1475.50 =    3410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1475.50 TO NODE   1476.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    92.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.50
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.35
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   19.04
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1476.00 =    3560.00 FEET.

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

```
 FLOW PROCESS FROM NODE   1476.00 TO NODE   1476.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.577
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5233
 SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.59
 TOTAL AREA(ACRES) =       41.2   TOTAL RUNOFF(CFS) =      55.56
 TC(MIN.) =   19.04

****************************************************************************
 FLOW PROCESS FROM NODE   1476.00 TO NODE   1476.00 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.) =   19.04
 RAINFALL INTENSITY(INCH/HR) =   2.58
 TOTAL STREAM AREA(ACRES) =    41.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     55.56

****************************************************************************
 FLOW PROCESS FROM NODE    399.00 TO NODE   1476.10 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  15.00   RAIN INTENSITY(INCH/HOUR) =  2.90
 TOTAL AREA(ACRES) =     0.01   TOTAL RUNOFF(CFS) =      0.01

****************************************************************************
 FLOW PROCESS FROM NODE   1476.10 TO NODE   1476.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.900
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8747
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.55
 TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       2.56
 TC(MIN.) =   15.00

****************************************************************************
 FLOW PROCESS FROM NODE   1476.10 TO NODE   1476.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.56
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   15.07
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1476.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1476.00 TO NODE   1476.00 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.) =   15.07
  RAINFALL INTENSITY(INCH/HR) =   2.89
  TOTAL STREAM AREA(ACRES) =     1.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.56

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       55.56    19.04        2.577         41.20
      2        2.56    15.07        2.895          1.01

  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       52.03    15.07       2.895
      2       57.84    19.04       2.577

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      57.84   Tc(MIN.) =   19.04
  TOTAL AREA(ACRES) =       42.2
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1476.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1476.00 TO NODE   1477.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    80.00
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.68
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.84
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   19.39
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1477.00 =    3960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1477.00 TO NODE   1477.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.549
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5389
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =       43.1   TOTAL RUNOFF(CFS) =      59.21
  TC(MIN.) =   19.39

****************************************************************************
  FLOW PROCESS FROM NODE   1477.00 TO NODE   1478.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    77.50
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.74
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.21
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   19.79
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1478.00 =    4410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1478.00 TO NODE   1478.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.517
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5436
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.33
  TOTAL AREA(ACRES) =       43.7   TOTAL RUNOFF(CFS) =      59.80
  TC(MIN.) =   19.79

****************************************************************************
  FLOW PROCESS FROM NODE   1478.00 TO NODE   1479.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.25
  FLOW LENGTH(FEET) =   475.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.76
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.80
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   20.21
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1479.00 =    4885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1479.00 TO NODE   1479.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.487
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5474
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.09
  TOTAL AREA(ACRES) =       44.2   TOTAL RUNOFF(CFS) =      60.19
  TC(MIN.) =   20.21

****************************************************************************
  FLOW PROCESS FROM NODE   1479.00 TO NODE   1480.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.25
  FLOW LENGTH(FEET) =   475.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.78
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.19
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   20.64
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1480.00 =    5360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1480.00 TO NODE   1480.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.462
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5511
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.08
  TOTAL AREA(ACRES) =       44.7   TOTAL RUNOFF(CFS) =      60.66
  TC(MIN.) =   20.64

****************************************************************************
  FLOW PROCESS FROM NODE   1480.00 TO NODE   1481.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.25
  FLOW LENGTH(FEET) =   475.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.79
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.66
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   21.06
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1481.00 =    5835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1481.00 TO NODE   1481.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.437
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5548
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.07
  TOTAL AREA(ACRES) =       45.2   TOTAL RUNOFF(CFS) =      61.11
  TC(MIN.) =   21.06

****************************************************************************
  FLOW PROCESS FROM NODE   1481.00 TO NODE   1482.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.25
  FLOW LENGTH(FEET) =   475.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.81
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.11
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   21.48
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1482.00 =    6310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1482.00 TO NODE   1482.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.411
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5583
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.06
  TOTAL AREA(ACRES) =       45.7   TOTAL RUNOFF(CFS) =      61.54
  TC(MIN.) =   21.48

****************************************************************************
  FLOW PROCESS FROM NODE   1482.00 TO NODE   1483.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    76.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.82
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.54
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   21.90
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1483.00 =    6790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1483.00 TO NODE   1483.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.386
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5618
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.05
  TOTAL AREA(ACRES) =       46.2   TOTAL RUNOFF(CFS) =      61.94
  TC(MIN.) =   21.90

****************************************************************************
  FLOW PROCESS FROM NODE   1483.00 TO NODE   1484.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    82.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.83
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.94
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   22.21
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1484.00 =    7140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1484.00 TO NODE   1484.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.367
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5632
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =       46.4   TOTAL RUNOFF(CFS) =      61.94
  TC(MIN.) =   22.21
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE   1484.00 TO NODE   1485.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    87.50
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.83
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.94
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   22.43
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1485.00 =    7390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1485.00 TO NODE   1485.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.354
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5659
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.83
  TOTAL AREA(ACRES) =       46.8   TOTAL RUNOFF(CFS) =      62.36
  TC(MIN.) =   22.43

****************************************************************************
  FLOW PROCESS FROM NODE   1485.00 TO NODE   1495.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     95.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.289
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      63.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.59
  AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =   1.09
  Tc(MIN.) =   23.52
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    1.85
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.562
  TOTAL AREA(ACRES) =       48.6         PEAK FLOW RATE(CFS) =      62.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =   4.54
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1495.00 =    7690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1495.00 TO NODE   1495.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   23.52
  RAINFALL INTENSITY(INCH/HR) =   2.29
  TOTAL STREAM AREA(ACRES) =    48.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     62.48

****************************************************************************
  FLOW PROCESS FROM NODE   1490.00 TO NODE   1490.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 SUBAREA RUNOFF(CFS) =      1.55
 TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.55

****************************************************************************
 FLOW PROCESS FROM NODE   1490.00 TO NODE   1491.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    97.50
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.27
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.55
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.11
 LONGEST FLOWPATH FROM NODE   1490.00 TO NODE   1491.00 =     350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1491.00 TO NODE   1491.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.378
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8800
 SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.77
 TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.31
 TC(MIN.) =    5.11

****************************************************************************
 FLOW PROCESS FROM NODE   1491.00 TO NODE   1495.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    93.75
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.31
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.37
 LONGEST FLOWPATH FROM NODE   1490.00 TO NODE   1495.00 =     475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1495.00 TO NODE   1495.00 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.) =    5.37
  RAINFALL INTENSITY(INCH/HR) =   4.33
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       62.48    23.52        2.289         48.61
      2        2.31     5.37        4.330          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       35.33     5.37       4.330
      2       63.70    23.52       2.289

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.70   Tc(MIN.) =   23.52
  TOTAL AREA(ACRES) =       49.2
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1495.00 =    7690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1495.00 TO NODE   1495.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  35.25   RAIN INTENSITY(INCH/HOUR) =  1.84
  TOTAL AREA(ACRES) =    49.20   TOTAL RUNOFF(CFS) =     46.00

****************************************************************************
  FLOW PROCESS FROM NODE   1495.00 TO NODE   1496.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.60
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.60
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.00
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   35.32
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1496.00 =    7730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1496.00 TO NODE   1496.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.840
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5038
  SUBAREA AREA(ACRES) =    3.30   SUBAREA RUNOFF(CFS) =    2.73
  TOTAL AREA(ACRES) =       52.5   TOTAL RUNOFF(CFS) =      48.68
  TC(MIN.) =   35.32

****************************************************************************
  FLOW PROCESS FROM NODE   1496.00 TO NODE   1499.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.35
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.65
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.68
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   35.60
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1499.00 =    7895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1499.00 TO NODE   1499.00 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       48.68    35.60        1.832       52.50
  LONGEST FLOWPATH FROM NODE   1450.00 TO NODE   1499.00 =    7895.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      275.86    28.89        2.044      285.10
  LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1499.00 =    7925.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     315.37      28.89        2.044
      2     295.88      35.60        1.832

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     315.37   Tc(MIN.) =   28.89
  TOTAL AREA(ACRES) =      337.6

****************************************************************************
  FLOW PROCESS FROM NODE   1499.00 TO NODE   1499.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.044
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4743
```

```
  SUBAREA AREA(ACRES) =    8.50   SUBAREA RUNOFF(CFS) =    7.82
  TOTAL AREA(ACRES) =      346.1   TOTAL RUNOFF(CFS) =     335.58
  TC(MIN.) =   28.89
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      346.1  TC(MIN.) =     28.89
  PEAK FLOW RATE(CFS)   =     335.58
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

Backup for Weighted Runoff Coefficients

15013 - Southwest Village Post Project Hydrology

Upstream Node	Downstream Node	TRIBUTARY AREA (SQ FT)	AREA (AC.)	%IMPERVIOUS (ASSUMED)	IMPERVIOUS POST PROJECT (SQFT)	SOIL TYPE	IMPERVIOUS RUNOFF COEFFICENT	PERVIOUS RUNOFF COEFFICENT	WEIGHTED RUNOFF COEFFICENT
BASIN 100/POC 1 - PA 7-10									
100	102	5857	0.1	0%	0	D	0.95	0.45	0.45
102	115	380336	8.7	0%	0	D	0.95	0.45	0.45
130	132	5497	0.1	65%	3573	D	0.95	0.45	0.78
132	141	29797	0.7	65%	19368	D	0.95	0.45	0.78
141	141	35659	0.8	65%	23178	D	0.95	0.45	0.78
151	151	73219	1.7	65%	47592	D	0.95	0.45	0.78
160	160	71676	1.6	65%	46589	D	0.95	0.45	0.78
165	165	40138	0.9	50%	20069	D	0.95	0.45	0.70
SUM		**642179**	**14.7**	**25%**	**160370**				**0.57**
BASIN 200/POC 2 - PA 7-10									
200	201	5287	0.1	85%	4494	D	0.95	0.45	0.88
201	202	44221	1.0	85%	37588	D	0.95	0.45	0.88
220	221	2262	0.1	0%	0	D	0.95	0.45	0.45
221	222	19058	0.4	60%	11435	D	0.95	0.45	0.75
223	223	36372	0.8	75%	27279	D	0.95	0.45	0.83
224	224	25016	0.6	75%	18762	D	0.95	0.45	0.83
225	225	93955	2.2	75%	70466	D	0.95	0.45	0.83
228	228	27495	0.6	75%	20621	D	0.95	0.45	0.83
235	235	65636	1.5	75%	49227	D	0.95	0.45	0.83
240	241	3814	0.1	75%	2861	D	0.95	0.45	0.83
241	245	7458	0.2	75%	5594	D	0.95	0.45	0.83
245	245	77580	1.8	75%	58185	D	0.95	0.45	0.83
246	246	36370	0.8	75%	27278	D	0.95	0.45	0.83
255	255	45960	1.1	75%	34470	D	0.95	0.45	0.83
259	259	63429	1.5	75%	47572	D	0.95	0.45	0.83
262	262	46339	1.1	75%	34754	D	0.95	0.45	0.83
263	263	25084	0.6	75%	18813	D	0.95	0.45	0.83
267	267	36529	0.8	75%	27397	D	0.95	0.45	0.83
290	291	3603	0.1	75%	2702	D	0.95	0.45	0.83

Upstream Node	Downstream Node	TRIBUTARY AREA (SQ FT)	AREA (AC.)	%IMPERVIOUS (ASSUMED)	IMPERVIOUS POST PROJECT (SQFT)	SOIL TYPE	IMPERVIOUS RUNOFF COEFFICENT	PERVIOUS RUNOFF COEFFICENT	WEIGHTED RUNOFF COEFFICENT
291	292	586931	13.5	75%	440198	D	0.95	0.45	0.83
292	292	991729	22.8	75%	743797	D	0.95	0.45	0.83
270	271	7625	0.2	75%	5719	D	0.95	0.45	0.83
271	272	17145	0.4	75%	12859	D	0.95	0.45	0.83
274	274	23384	0.5	75%	17538	D	0.95	0.45	0.83
275	275	21054	0.5	75%	15791	D	0.95	0.45	0.83
276	276	17897	0.4	75%	13423	D	0.95	0.45	0.83
277	277	39157	0.9	75%	29368	D	0.95	0.45	0.83
279	279	25944	0.6	75%	19458	D	0.95	0.45	0.83
285	285	100339	2.3	75%	75254	D	0.95	0.45	0.83
286	286	62732	1.4	75%	47049	D	0.95	0.45	0.83
298	298	45699	1.0	75%	34274	D	0.95	0.45	0.83
SUM		**2605104**	**59.8**	**75%**	**1954224**				**0.83**
BASIN 300/ Vault 3A/ PA11-14									
300	302	3279	0.1	65%	2131	D	0.95	0.45	0.78
302	304	20959	0.5	65%	13623	D	0.95	0.45	0.78
306	306	15250	0.4	65%	9913	D	0.95	0.45	0.78
308	308	23949	0.5	65%	15567	D	0.95	0.45	0.78
310	310	23086	0.5	65%	15006	D	0.95	0.45	0.78
312	312	21910	0.5	65%	14242	D	0.95	0.45	0.78
314	314	21978	0.5	65%	14286	D	0.95	0.45	0.78
316	316	32526	0.7	65%	21142	D	0.95	0.45	0.78
318	318	39045	0.9	65%	25379	D	0.95	0.45	0.78
320	320	53267	1.2	65%	34624	D	0.95	0.45	0.78
322	322	42152	1.0	65%	27399	D	0.95	0.45	0.78
324	324	26797	0.6	65%	17418	D	0.95	0.45	0.78
325	325	25657	0.6	65%	16677	D	0.95	0.45	0.78
326	326	25924	0.6	65%	16851	D	0.95	0.45	0.78
328	328	67398	1.5	65%	43809	D	0.95	0.45	0.78
330	330	43371	1.0	65%	28191	D	0.95	0.45	0.78
332	332	50030	1.1	65%	32520	D	0.95	0.45	0.78
334	334	67398	1.5	65%	43809	D	0.95	0.45	0.78

Upstream Node	Downstream Node	TRIBUTARY AREA (SQ FT)	AREA (AC.)	%IMPERVIOUS (ASSUMED)	IMPERVIOUS POST PROJECT (SQFT)	SOIL TYPE	IMPERVIOUS RUNOFF COEFFICENT	PERVIOUS RUNOFF COEFFICENT	WEIGHTED RUNOFF COEFFICENT
336	336	49481	1.1	65%	32163	D	0.95	0.45	0.78
339.1	339.2	3520	0.1	75%	2640	D	0.95	0.45	0.83
339.2	340	49107	1.1	75%	36830	D	0.95	0.45	0.83
342	342	56091	1.3	75%	42068	D	0.95	0.45	0.83
344	344	47868	1.1	75%	35901	D	0.95	0.45	0.83
346	346	56900	1.3	75%	42675	D	0.95	0.45	0.83
348	348	43157	1.0	75%	32368	D	0.95	0.45	0.83
350	350	42605	1.0	75%	31954	D	0.95	0.45	0.83
351	351	23213	0.5	75%	17410	D	0.95	0.45	0.83
352	353	3267	0.1	75%	2450	D	0.95	0.45	0.83
353	354	16511	0.4	75%	12383	D	0.95	0.45	0.83
355	355	46104	1.1	75%	34578	D	0.95	0.45	0.83
356	356	34255	0.8	75%	25691	D	0.95	0.45	0.83
357	357	28885	0.7	75%	21664	D	0.95	0.45	0.83
358	358	28687	0.7	75%	21515	D	0.95	0.45	0.83
360	360	36468	0.8	75%	27351	D	0.95	0.45	0.83
362	362	36233	0.8	75%	27175	D	0.95	0.45	0.83
364	364	28686	0.7	75%	21515	D	0.95	0.45	0.83
366	366	50274	1.2	75%	37706	D	0.95	0.45	0.83
367.1	367.2	4204	0.1	65%	2733	D	0.95	0.45	0.78
367.2	368	8594	0.2	65%	5586	D	0.95	0.45	0.78
370	370	32434	0.7	65%	21082	D	0.95	0.45	0.78
372	372	32342	0.7	65%	21022	D	0.95	0.45	0.78
374	374	21887	0.5	65%	14227	D	0.95	0.45	0.78
376	376	50364	1.2	65%	32737	D	0.95	0.45	0.78
378	378	44071	1.0	65%	28646	D	0.95	0.45	0.78
380	380	54042	1.2	75%	40532	D	0.95	0.45	0.83
382	382	31897	0.7	75%	23923	D	0.95	0.45	0.83
384	384	37599	0.9	75%	28199	D	0.95	0.45	0.83
SUM		**1602722**	**36.8**	**70%**	**1117306**				**0.80**
BASIN 1400 - BEYER ROAD AND MOODY CANYON OFFSITES									
1400	1401	14173	0.3	50%	7087	D	0.95	0.45	0.70

Upstream Node	Downstream Node	TRIBUTARY AREA (SQ FT)	AREA (AC.)	%IMPERVIOUS (ASSUMED)	IMPERVIOUS POST PROJECT (SQFT)	SOIL TYPE	IMPERVIOUS RUNOFF COEFFICENT	PERVIOUS RUNOFF COEFFICENT	WEIGHTED RUNOFF COEFFICENT
1401	1402	569147	13.1	50%	284574	D	0.95	0.45	0.70
1403	1403	224794	5.2	70%	157356	D	0.95	0.45	0.80
1402	1404	752554	17.3	5%	37628	D	0.95	0.45	0.48
1404	1405	1062972	24.4	0%	0	D	0.95	0.45	0.45
199	1405	808107	18.6	0%	0	D	0.95	0.45	0.45
1405	1410	222771	5.1	0%	0	D	0.95	0.45	0.45
299	1410	794060	18.2	0%	0	D	0.95	0.45	0.45
1410	1420	697434	16.0	0%	0	D	0.95	0.45	0.45
1416	1417	2806	0.1	0%	0	D	0.95	0.45	0.45
1417	1418	62119	1.4	0%	0	D	0.95	0.45	0.45
1418	1420	95169	2.2	0%	0	D	0.95	0.45	0.45
1420	1430	2874356	66.0	0%	0	D	0.95	0.45	0.45
1427	1428	4353	0.1	0%	0	D	0.95	0.45	0.45
1428	1429	209644	4.8	0%	0	D	0.95	0.45	0.45
1450	1451	4560	0.1	0%	0	D	0.95	0.45	0.45
1451	1453	106620	2.4	0%	0	D	0.95	0.45	0.45
1453.1	1453.1	101606	2.3	0%	0	D	0.95	0.45	0.45
1453	1454	149586	3.4	0%	0	D	0.95	0.45	0.45
1454.1	1454.1	26590	0.6	0%	0	D	0.95	0.45	0.45
1454.2	1454.2	185613	4.3	0%	0	D	0.95	0.45	0.45
1454	1455	79919	1.8	0%	0	D	0.95	0.45	0.45
1455.1	1455.1	9697	0.2	0%	0	D	0.95	0.45	0.45
1470	1471	3455	0.1	85%	2937	D	0.95	0.45	0.88
1471	1472	33660	0.8	85%	28611	D	0.95	0.45	0.88
1472.2	1472.2	14676	0.3	85%	12475	D	0.95	0.45	0.88
1473.1	1473.1	31323	0.7	85%	26625	D	0.95	0.45	0.88
1473.2	1473.2	28863	0.7	85%	24534	D	0.95	0.45	0.88
1475.1	1475.1	31880	0.7	85%	27098	D	0.95	0.45	0.88
1475.2	1475.2	12312	0.3	85%	10465	D	0.95	0.45	0.88
1476.1	1476.1	43326	1.0	85%	36827	D	0.95	0.45	0.88
1476.2	1476.2	31815	0.7	85%	27043	D	0.95	0.45	0.88
1477.1	1477.1	28148	0.6	85%	23926	D	0.95	0.45	0.88

Upstream Node	Downstream Node	TRIBUTARY AREA (SQ FT)	AREA (AC.)	%IMPERVIOUS (ASSUMED)	IMPERVIOUS POST PROJECT (SQFT)	SOIL TYPE	IMPERVIOUS RUNOFF COEFFICENT	PERVIOUS RUNOFF COEFFICENT	WEIGHTED RUNOFF COEFFICENT
1477.2	1477.2	8880	0.2	85%	7548	D	0.95	0.45	0.88
1478.1	1478.1	17558	0.4	85%	14924	D	0.95	0.45	0.88
1478.2	1478.2	9175	0.2	85%	7799	D	0.95	0.45	0.88
1479.1	1479.1	13037	0.3	85%	11081	D	0.95	0.45	0.88
1479.2	1479.2	9463	0.2	85%	8044	D	0.95	0.45	0.88
1480.1	1480.1	12970	0.3	85%	11025	D	0.95	0.45	0.88
1480.2	1480.2	9432	0.2	85%	8017	D	0.95	0.45	0.88
1481.1	1481.1	12868	0.3	85%	10938	D	0.95	0.45	0.88
1481.2	1481.2	9572	0.2	85%	8136	D	0.95	0.45	0.88
1482.1	1482.1	12777	0.3	85%	10860	D	0.95	0.45	0.88
1482.2	1482.2	9498	0.2	85%	8073	D	0.95	0.45	0.88
1483.1	1483.1	12809	0.3	85%	10888	D	0.95	0.45	0.88
1483.2	1483.2	9845	0.2	85%	8368	D	0.95	0.45	0.88
1484.1	1484.1	7105	0.2	85%	6039	D	0.95	0.45	0.88
1485	1485	16272	0.4	85%	13831	D	0.95	0.45	0.88
1490	1490	15821	0.4	85%	13448	D	0.95	0.45	0.88
1491	1491	8677	0.2	85%	7375	D	0.95	0.45	0.88
1495	1495	78269	1.8	0%	0	D	0.95	0.45	0.45
1496.1	1496.1	143880	3.3	0%	0	D	0.95	0.45	0.45
1498.5	1498.5	371968	8.5	0%	0	D	0.95	0.45	0.45
SUM		**10107984.0**	**232.0**	**9%**	**873578.0**				**0.49**

Totals for Moody Canyon / POC M.C.							
Major Basin			Area	%Impervious			Weighted Runoff Coefficent
100			14.7	25%			0.57
200			59.8	75%			0.83
300			36.8	70%			0.80
1400			232.0	9%			0.49
Sum			**343.4**	**27%**			**0.59**

15013 - Southwest Village - Summary Of Hydrology

			PRE PROJECT			POST PROJECT					
								UNDETAINED		DETAINED	
POI #	Pre Project Node	Post Project Node	AREA	T-C	Q-100	AREA	ΔAREA	T-C	Q-100	T-C	Q-100
1	199	199	17.2	15.3	22.3	14.7	-2.5	12.9	29.8	13.9	18.4
2	299	299	61.0	15.9	77.7	59.8	-1.2	11.5	99.7	19.5	72.5
3A	399	398	27.6	15.0	36.1	29.7	9.3	11.9	79.4	18.9	46.0
3B		399				7.2		10.3	19.8		
M.C. (MOODY CANYON)	**1499**	**1499**	**319.9**	**24.2**	**337.0**	**343.4**	23.5	**22.9**	**429.4**	**28.9**	**335.6**
4	499	499	7.3	12.9	9.5						
5	599	599	14.3	16.3	18.0						

Note:

1. THE PROJECT PROPOSES TO DIVERT A TOTAL OF 23.5 AC INTO THE MOODY CANYON WATERSHED AT NODE 1499, THE PROJECT'S POINT OF CONNECTION TO EXISTING INFRASTRUCTURE.
2. THE MAJORITY OF THIS DIVERSION IS FROM BASINS 400 AND 500 (21.6 AC). ADDITIONAL DIVERSION IS DUE TO ROADWAY GRADING FOR BEYER ROAD.
3. BASIN 300 USES A VAULT TYPE BMP TO DETAIN PEAK RUNOFF. THERE ARE TWO INFLOW LINES TO THE VAULT AND EACH LINE HAS A BYPASS PIPE. FOR THE DETAINED CONDITION THERE IS UNCERTAINTY ABOUT HOW FLOWS WILL BE DISTRUBUTED AMONG THE TWO PARALLEL OUTFLOW PIPES. MORE DETAIL ABOUT THIS DISTRIBUTION MAY BE PROVIDED IN FINAL ENGINEERING.
4. UNITS ARE IN ACRES, MINUTES, AND CFS
5. PLEASE REFER TO THE DRAINAGE MAPS FOR NODE AND POINT OF INTEREST LOCATIONS.

APPENDIX D

Preliminary Inlet Sizing Calculations

Southwest Village
15013C
3/2/2022

Typical Grate inlet sizing

Grate Inlet Sizing (Weir vs. Orifice)

Weir coefficient, C_w	3.0
Orifice coefficient, C_o	0.60
Available head, h (feet)	0.25

3 inch depression - typical

Inlet Type	Capacity based on Weir Equation[3, 4], Q_{cap} (cfs^5)	Capacity based on Orifice Equation[3, 4], Q_{cap} (cfs^5)	Governing Equation
1212 Series - 12"x12" Catch Basin[1]	0.80	1.34	Weir
1218 Series - 12"x18" Catch Basin[1]	0.92	1.79	Weir
1818 Series - 18"x18" Catch Basin[1]	1.05	2.28	Weir
2424 Series - 24"x24" Catch Basin[1]	1.35	3.81	Weir
3636 Series - 36"x36" Catch Basin[1]	1.97	7.96	Weir
Type 'I' Catch Basin[2]	1.73	5.85	Weir

Note:

1. Based on Brooks Products, Inc. - H 20-44 Traffic, Steel Grate, not Parkway, Cast-iron grate
2. Based on Drawing Number D-13 & D-15 in the City of San Diego Regional Standard Drawings, dated April 2003
3. A reduction factor of 50% assumed for clogging.
4. Weir equation, $Q = C_w L_e (h)^{3/2}$; Orifice equation, $Q = C_o A_e (2gh)^{1/2}$
5. "cfs" = cubic feet per second

[File]

15013 - Southwest Village

INLET NODE	AREA (ac)	I (in/hr)	C	Q100 (cfs)	LOCATION	INLET SELECTION
115	8.8	4.4	0.45	17.4	Sump	Type-F
120	0.1	4.4	0.45	0.2	Sump	12-12 Brookes Box
122	0.4	4.4	0.45	0.8	Sump	Type-F
135	0.8	4.4	0.78	2.7	Grade	B6
140	0.8	4.4	0.78	2.7	Grade	B6
150	1.7	4.4	0.78	5.8	Sump	B6
160	1.6	4.4	0.78	5.5	Sump	B6
170	0.4	4.4	0.45	0.8	Sump	Type-F
202	1.1	4.4	0.83	4.0	Grade	B8
211	1.0	4.4	0.83	3.7	Sump	B4
212	0.5	4.4	0.83	1.8	Grade	B4
213	0.1	4.4	0.83	0.4	Sump	B4
214	0.1	4.4	0.83	0.4	Sump	B4
216	0.5	4.4	0.83	1.8	Sump	B4
222	0.5	4.4	0.65	1.4	Grade	B4
223	0.8	4.4	0.83	2.9	Grade	B6
224	0.6	4.4	0.83	2.2	Grade	B6
226	0.5	4.4	0.83	1.8	Sump	B4
227	0.1	4.4	0.83	0.4	Sump	B4
231	0.5	4.4	0.83	1.8	Grade	B4
232	1.0	4.4	0.83	3.7	Grade	B8
243	0.7	4.4	0.83	2.6	Sump	2424 Brooks Box
245	1.3	4.4	0.83	4.7	Sump	2424 Brooks Box
246	0.8	4.4	0.83	2.9	Sump	2424 Brooks Box
251	0.5	4.4	0.83	1.8	Sump	B4
252	0.5	4.4	0.83	1.8	Sump	B4
253	0.1	4.4	0.83	0.4	Sump	B4
256	0.3	4.4	0.83	1.1	Sump	B4
257	0.4	4.4	0.83	1.5	Sump	B4
258	0.8	4.4	0.83	2.9	Sump	2424 Brooks Box
260	0.1	4.4	0.83	0.4	Grade	B4
261	1.0	4.4	0.83	3.7	Grade	B8
263	0.6	4.4	0.83	2.2	Grade	B6
267	0.8	4.4	0.83	2.9	Grade	B10
272	0.6	4.4	0.83	2.2	Grade	B6
273	0.5	4.4	0.83	1.8	Grade	B4
275	0.5	4.4	0.45	1.0	Sump	1818 Brooks Box
276	0.4	4.4	0.83	1.5	Grade	B4

277	0.9	4.4	0.83	3.3	Grade	B8
278	0.6	4.4	0.83	2.2	Grade	B6
282	0.6	4.4	0.83	2.2	Grade	B6
283	0.6	4.4	0.83	2.2	Grade	B6
285	1.1	4.4	0.83	4.0	Sump	B6
286	1.4	4.4	0.83	5.1	Sump	B6
298	1.0	4.4	0.45	2.0	Sump	Type F
304	0.6	4.4	0.78	2.1	Sump	2424 Brooks Box
306	0.4	4.4	0.78	1.4	Sump	2424 Brooks Box
308	0.5	4.4	0.78	1.7	Sump	B4
310	0.5	4.4	0.78	1.7	Sump	B4
312	0.5	4.4	0.78	1.7	Sump	B4
314	0.5	4.4	0.78	1.7	Sump	B4
316	0.7	4.4	0.78	2.4	Sump	B4
318	0.9	4.4	0.78	3.1	Sump	B8
320	1.2	4.4	0.78	4.1	Grade	B10
322	1.0	4.4	0.78	3.4	Grade	B10
324	0.6	4.4	0.78	2.1	Grade	B6
325	0.6	4.4	0.78	2.1	Grade	B6
328	0.6	4.4	0.78	2.1	Sump	B4
330	1.5	4.4	0.78	5.1	Sump	B6
332	1.1	4.4	0.78	3.8	Grade	B8
334	1.5	4.4	0.78	5.1	Sump	B6
336	1.1	4.4	0.78	3.8	Sump	B4
326	0.5	4.4	0.78	1.7	Sump	B4
339.2	0.1	4.4	0.83	0.4	Sump	B4
340	1.1	4.4	0.83	4.0	Grade	B6
342	1.3	4.4	0.83	4.7	Grade	B6
344	1.0	4.4	0.83	3.7	Grade	B6
346	1.3	4.4	0.83	4.7	Grade	B8
348	1.0	4.4	0.83	3.7	Grade	B6
350	1.0	4.4	0.83	3.7	Grade	B8
351	0.5	4.4	0.83	1.8	Grade	B8
354	1.0	4.4	0.83	3.7	Sump	2424 Brooks Box
356	0.8	4.4	0.83	2.9	Grade	B6
357	0.7	4.4	0.83	2.6	Grade	B6
358	0.7	4.4	0.83	2.6	Grade	B6
360	0.8	4.4	0.83	2.9	Grade	B6
362	0.8	4.4	0.83	2.9	Grade	B6
364	0.7	4.4	0.83	2.6	Grade	B6
366	1.2	4.4	0.83	4.4	Sump	B8
368	0.3	4.4	0.78	1.0	Sump	Type F

370	0.7	4.4	0.78	2.4	Grade	B6
372	0.7	4.4	0.78	2.4	Grade	B6
374	0.5	4.4	0.78	1.7	Sump	2424 Brooks Box
376	1.2	4.4	0.78	4.1	Sump	B4
378	1.0	4.4	0.78	3.4	Sump	B4
380	1.2	4.4	0.83	4.4	Grade	B6
382	0.7	4.4	0.83	2.6	Grade	B6
384	0.9	4.4	0.83	3.3	Sump	B8
1472.1	0.9	4.4	0.88	3.5	Grade	B8
1472.2	0.3	4.4	0.88	1.3	Grade	B4
1473.1	0.7	4.4	0.88	2.8	Grade	B6
1473.2	0.7	4.4	0.88	2.6	Grade	B6
1475.1	0.7	4.4	0.88	2.8	Grade	B6
1475.2	0.3	4.4	0.88	1.1	Grade	B4
1476.1	1.0	4.4	0.88	3.8	Grade	B8
1476.2	0.7	4.4	0.88	2.8	Grade	B6
1477.1	0.6	4.4	0.88	2.5	Grade	B6
1477.2	0.2	4.4	0.88	0.8	Grade	B4
1478.1	0.4	4.4	0.88	1.6	Grade	B4
1478.2	0.2	4.4	0.88	0.8	Grade	B4
1479.1	0.3	4.4	0.88	1.2	Grade	B4
1479.2	0.2	4.4	0.88	0.8	Grade	B4
1480.1	0.3	4.4	0.88	1.1	Grade	B4
1480.2	0.2	4.4	0.88	0.8	Grade	B4
1481.1	0.3	4.4	0.88	1.1	Grade	B4
1481.2	0.2	4.4	0.88	0.8	Grade	B4
1482.1	0.3	4.4	0.88	1.1	Grade	B4
1482.2	0.2	4.4	0.88	0.8	Grade	B4
1483.1	0.3	4.4	0.88	1.1	Grade	B4
1483.2	0.2	4.4	0.88	0.9	Grade	B4
1484.1	0.2	4.4	0.88	0.6	Grade	B4
1485.0	0.4	4.4	0.88	1.4	Grade	B20
1490.0	0.4	4.4	0.88	1.4	Grade	B4
1491.0	0.2	4.4	0.88	0.8	Grade	B4

NOTES

1. Q100 IS BASED ON MINIMUM 5MIN TC
2. MIN OF 1-INCH OF FREEBOARD IS PROVIDED BELOW TOP OF CURB
3. WHILE INLETS ARE NOT DESIGNED TO BYPASS FLOWS, INLETS AT TERMINAL SUMPS OR OTHER KEY LOCATIONS WHERE BYPASS WOULD BE UNDESIREABLE HAVE BEEN UPSZIED FOR ADDED SAFETY.

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Inlet Capcity Calculation (Sag)				
Type of Inlet	**Length of Opening (ft)**	**Allowable Depth (in)**	**Gutter Depression (in)**	**Weir Flow (cfs)**
B-Type	4	5	4	4.7
B-Type	6	5	4	5.9
B-Type	8	5	4	7.2
B-Type	10	5	4	8.4
B-Type	12	5	4	9.7
B-Type	14	5	4	11.3
B-Type	16	5	4	12.9
B-Type	18	5	4	14.5
B-Type	20	5	4	16.1

Notes

1. Refer to HEC-22 - Section 4.4.4.2 Curb Opening Inlets for equations and backup.

Inlet Capcity Calculation (On Grade)				
Type of Inlet	**Length of Opening (ft)**	**Allowable Depth (in)**	**Gutter Depression (in)**	**Weir Flow (cfs)**
B-Type	4	5	4	1.8
B-Type	6	5	4	2.7
B-Type	8	5	4	3.6
B-Type	10	5	4	4.5
B-Type	12	5	4	5.5
B-Type	14	5	4	6.4
B-Type	16	5	4	7.3
B-Type	18	5	4	8.2
B-Type	20	5	4	9.1

Notes

1. Refer to HEC-22 - Section 4.4.4.2 Curb Opening Inlets for equations and backup.

APPENDIX E

Preliminary Storm Drain Sizing Calculations

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Preliminary Storm Drain Size Detained 100-yr

The purpose of this table is to provide an estimated pipe size to convey the 100-year flow rates with a sizing factor.

Manning's n: 0.013

Sizing Factor (%): 30

Upstream Node	Downstream Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Estimated Slope (%)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Selected Pipe Size (inches)	Notes
PA 7-10 (Basin 100)								
115.0	179.0	10.0	13.0	5.0%	1.20	18"	**24**	Upsize pipe due to difficulty in accessing outfall
120.0	122.0	1.0	1.3	1.0%	0.68	10"	**18**	18" COSD minimum Pipe size
122.0	165.0	2.0	2.6	1.0%	0.89	12"	**18**	18" COSD minimum Pipe size
135.0	141.0	2.4	3.1	1.0%	0.95	12"	**18**	18" COSD minimum Pipe size
140.0	141.0	2.4	3.1	1.0%	0.95	12"	**18**	18" COSD minimum Pipe size
141.0	151.0	4.8	6.2	1.0%	1.23	18"	**18**	18" COSD minimum Pipe size
150.0	151.0	5.1	6.6	1.0%	1.26	18"	**18**	18" COSD minimum Pipe size
151.0	160.0	9.9	12.9	1.0%	1.62	24"	**24**	
160.0	165.0	13.5	17.6	1.0%	1.82	24"	**24**	
165.0	170.0	15.0	19.5	2.0%	1.66	24"	**24**	
170.0	179.0	15.5	20.2	5.0%	1.41	18"	**30**	Upsize pipe due to difficulty in accessing outfall
179.0	180.0	25.5	33.2	5.0%	1.71	24"	**30**	Upsize pipe due to difficulty in accessing outfall

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Upstream Node	Downstream Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Estimated Slope (%)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Selected Pipe Size (inches)	Notes
PA 7-10 (Basin 200)								
202.0	230.0	2.0	2.6	1.0%	0.89	12"	**18**	18" COSD minimum Pipe size
210.0	212.0	3.0	3.9	1.0%	1.03	18"	**18"**	
211.0	212.0	0.5	0.7	1.0%	0.53	8"	**18**	18" COSD minimum Pipe size
212.0	215.0	2.5	3.3	1.0%	0.97	12"	**18**	18" COSD minimum Pipe size
215.0	216.0	5.0	6.5	1.0%	1.25	18"	**18"**	
216.0	225.0	7.5	9.8	1.0%	1.46	18"	**18"**	
222.0	223.0	1.5	2.0	1.0%	0.80	10"	**18**	18" COSD minimum Pipe size
223.0	224.0	3.9	5.1	1.0%	1.14	18"	**18"**	
224.0	225.0	5.7	7.4	1.0%	1.31	18"	**18"**	
225.0	228.0	11.5	15.0	1.0%	1.71	24"	**24"**	
228.0	230.0	12.5	16.3	1.0%	1.76	24"	**24"**	
230.0	235.0	16.0	20.8	1.0%	1.94	24"	**24"**	
231.0	235.0	2.5	3.3	1.0%	0.97	12"	**18**	18" COSD minimum Pipe size
232.0	235.0	4.0	5.2	1.0%	1.15	18"	**18"**	
235.0	265.0	20.0	26.0	1.0%	2.11	30"	**30"**	
246.0	255.0	6.0	7.8	1.0%	1.34	18"	**18"**	
254.0	255.0	3.3	4.3	1.0%	1.07	18"	**18"**	
255.0	256.0	9.3	12.1	1.0%	1.58	24"	**24"**	
258.0	258.1	2.0	2.6	1.0%	0.89	12"	**18**	18" COSD minimum Pipe size
257.0	258.1	1.0	1.3	1.0%	0.68	10"	**18**	18" COSD minimum Pipe size
258.1	259.0	4.5	5.9	1.0%	1.20	18"	**18"**	
259.0	262.0	14.9	19.4	1.0%	1.89	24"	**24"**	
262.0	263.0	17.6	22.9	1.0%	2.01	24"	**24"**	
263.0	265.0	19.3	25.0	1.0%	2.08	30"	**30"**	

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Upstream Node	Downstream Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Estimated Slope (%)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Selected Pipe Size (inches)	Notes
265.0	267.0	39.6	51.5	1.0%	2.72	36"	**36"**	
267.0	269.0	41.8	54.3	1.0%	2.78	36"	**36"**	
269.0	295.0	41.8	54.3	1.0%	2.78	36"	**36"**	
292.0	295.0	39.6	51.5	1.0%	2.72	36"	**36"**	
295.0	298.0	80.0	104.0	1.0%	3.54	48"	**48"**	
282.0	284.0	1.5	2.0	1.0%	0.80	10"	**18**	18" COSD minimum Pipe size
283.0	284.0	1.5	2.0	1.0%	0.80	10"	**18**	18" COSD minimum Pipe size
284.0	285.0	3.0	3.9	1.0%	1.03	18"	**18**	
272.0	277.0	6.0	7.8	1.0%	1.34	18"	**18"**	
277.0	279.0	8.7	11.3	1.0%	1.54	24"	**24"**	
279.0	285.0	10.5	13.7	1.0%	1.65	24"	**24"**	
285.0	286.0	17.4	22.6	1.0%	2.00	24"	**24"**	
286.0	289.0	20.0	26.0	1.0%	2.11	30"	**30"**	
289.0	298.0	30.0	39.0	2.0%	2.15	30"	**30"**	
298.0	299.0	100.0	130.0	5.0%	2.85	36"	**36"**	Upsize pipe due to difficulty in accessing outfall

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Upstream Node	Downstream Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Estimated Slope (%)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Selected Pipe Size (inches)	Notes
PA 11-14 (Basin 300)								
304.0	306.0	1.9	2.5	1.0%	0.87	12"	**18**	
306.0	308.0	3.2	4.2	1.0%	1.06	18"	**18"**	
308.0	310.0	4.7	6.1	1.0%	1.22	18"	**18"**	
310.0	312.0	6.2	8.1	1.0%	1.36	18"	**18"**	
312.0	319.0	7.7	10.0	1.0%	1.47	18"	**18"**	
314.0	318.0	6.4	8.3	1.0%	1.37	18"	**18"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
316.0	318.0	6.4	8.3	1.0%	1.37	18"	**18"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
318.0	319.0	6.4	8.3	1.0%	1.37	18"	**18"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
319.0	323.0	14.0	18.3	0.5%	2.10	30"	**30"**	Storm Drain Bucks Grade (use minimum slope)
323.0	331.0	19.0	24.7	0.5%	2.35	30"	**30"**	Flat slope to daylight due to grade buck
324.0	325.0	11.9	15.4	2.0%	1.52	24"	**24"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
325.0	330.0	11.9	15.5	2.0%	1.52	24"	**24"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
328.0	330.0	11.9	15.5	2.0%	1.52	24"	**24"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
330.0	331.0	11.9	15.5	2.0%	1.52	24"	**24"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
331.0	332.0	30.6	39.8	0.5%	2.81	36"	**36"**	Flat slope to daylight due to grade buck
332.0	337.0	33.5	43.6	0.5%	2.91	36"	**36"**	Flat slope to daylight due to grade buck
334.0	336.0	2.7	3.5	2.0%	0.87	12"	**12"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
336.0	337.0	2.7	3.5	2.0%	0.87	12"	**12"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
337.0	338.0	40.5	52.6	0.5%	3.12	42"	**42"**	No Specific Hydrology (use DS Vaule)
338.0	351.1	40.5	52.6	0.5%	3.12	42"	**42"**	Flat slope to daylight due to grade buck
339.2	340.0	4.1	5.4	1.0%	1.17	18"	**18"**	No Specific Hydrology (use DS Vaule)
340.0	342.0	4.1	5.4	1.0%	1.17	18"	**18"**	

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Upstream Node	Downstream Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Estimated Slope (%)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Selected Pipe Size (inches)	Notes
342.0	344.0	8.4	10.9	1.0%	1.52	24"	**24"**	
344.0	346.0	11.8	15.3	1.0%	1.73	24"	**24"**	
346.0	349.0	15.5	20.2	1.0%	1.91	24"	**24"**	No Specific Hydrology (use DS Vaule)
348.0	349.0	7.8	10.2	1.0%	1.48	18"	**18"**	No Specific Hydrology (use DS Code - 8 to size upstream lines)
349.0	350.0	15.5	20.2	1.0%	1.91	24"	**24"**	No Specific Hydrology (use DS Vaule)
350.0	351.1	23.1	30.1	1.0%	2.22	30"	**30"**	
351.1	357.1	61.1	79.4	1.0%	3.20	42"	**42"**	
354.0	355.0	1.7	2.2	1.0%	0.84	10"	**10"**	
355.0	356.0	5.5	7.2	1.0%	1.30	18"	**18"**	
356.0	357.0	7.9	10.3	1.0%	1.49	18"	**18"**	
357.0	357.1	10.1	13.1	1.0%	1.63	24"	**24"**	
357.1	358.0	69.7	90.5	1.0%	3.36	42"	**42"**	
358.0	366.0	69.7	90.5	1.0%	3.36	42"	**42"**	
366.0	367.0	69.7	90.5	1.0%	3.36	42"	**42"**	
360.0	362.0	3.2	4.1	1.0%	1.05	18"	**18"**	
362.0	364.0	5.8	7.6	1.0%	1.32	18"	**18"**	
364.0	367.0	8.1	10.5	1.0%	1.50	18"	**18"**	
367.0	398.0	79.4	103.3	1.0%	3.53	48"	**48"**	
368.0	370.0	0.9	1.2	1.0%	0.66	8"	**8"**	
370.0	372.0	3.0	3.8	1.0%	1.03	18"	**18"**	
372.0	379.0	6.2	8.1	1.0%	1.36	18"	**18"**	
379.0	380.0	12.2	15.9	1.0%	1.75	24"	**24"**	
380.0	382.0	15.6	20.3	1.0%	1.92	24"	**24"**	
382.0	385.0	17.3	22.5	1.0%	2.00	24"	**24"**	
385.0	399.0	19.8	25.8	1.0%	2.10	30"	**30"**	

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Upstream Node	Downstream Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Estimated Slope (%)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Selected Pipe Size (inches)	Notes
Beyer Blvd. (Basin 1400)								
1472.0	1474.0	3.6	4.7	2.0%	0.97	12"	**18"**	
1473.0	1474.0	4.1	5.3	2.0%	1.02	18"	**18"**	
1474.0	1475.0	7.7	10.0	2.0%	1.29	18"	**18"**	
1475.0	1475.5	10.3	13.4	3.0%	1.34	18"	**18"**	
1475.5	1476.0	0.0	0.0	3.0%	0.00	3"	**42**	These pipes run in parallel and have been sized for undetained Q100 Flow Rates out of BMP 3. Please refer to the Drainage exhibits for Context.
1476.1	1476.0	57.0	74.1	3.0%	2.54	36"	**36**	
1476.0	1477.0	57.8	75.1	3.0%	2.55	36"	**42**	Upsized for initial design, may be reduced later
1477.0	1478.0	59.2	77.0	3.0%	2.57	36"	**42**	Upsized for initial design, may be reduced later
1478.0	1479.0	59.8	77.7	5.0%	2.35	30"	**42**	Upsize to avoid telescoping
1479.0	1480.0	60.2	78.3	5.0%	2.35	30"	**42**	
1480.0	1481.0	60.7	78.9	5.0%	2.36	30"	**42**	
1481.0	1482.0	61.1	79.4	5.0%	2.37	30"	**42**	
1482.0	1483.0	61.5	80.0	5.0%	2.37	30"	**42**	
1483.0	1484.0	61.9	80.5	5.0%	2.38	30"	**42**	
1484.0	1485.0	61.9	80.5	5.0%	2.38	30"	**42**	
1485.0	BMP1400	62.4	81.1	5.0%	2.39	30"	**42**	
1490.0	1491.0	1.6	2.1	2.0%	0.72	10"	**18**	
1491.0	BMP1400	2.3	3.0	2.0%	0.82	10"	**18**	
1495.0	1496.0	46.0	59.8	3.0%	2.34	30"	**42**	Upsize to keep Outlet Pipe >= Inlet Pipe
1496.1	1496.0	10.9	14.2	2.0%	1.47	18"	**24**	Unknown Park grading Tributary area (up to 3ac) not included in Q. Pipe was upsized 6-inch due to uncertainty
1496.0	1499.0	48.7	63.3	5.0%	2.17	30"	**42**	Upsize to avoid telescoping

Southwest Village
15013C
3/2/2022

Upstream Node	Downstream Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Estimated Slope (%)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Selected Pipe Size (inches)	Notes
1430.0	1498.0	261.9	340.5	5.0%	4.08	54"	**54"**	
1453.1	1453.0	3.4	4.4	5.0%	0.80	10"	**18**	
1454.2	1454.1	6.8	8.8	5.0%	1.04	18"	**18"**	
1454.0	1454-culvert	18.3	23.8	5.0%	1.51	18"	**18"**	
1455.0	1498.0	20.1	26.1	5.0%	1.56	24"	**24"**	
1498.0	1499.0	275.9	358.7	5.0%	4.16	54"	**54"**	
1499.0	1499.1	335.6	436.3	2.6%	5.07	72"	**54**	Existing Beyer Road Storm Drain System. See AES pipeflow analysis for HGL calculation
1499.1	1499.2	347.0	451.1	5.2%	4.51	60"	**54**	Existing Beyer Road Storm Drain System. Includes estimated 11ac from 18" on Delany Drive. See AES pipeflow analysis.

Note:

1. "cfs" = cubic feet per second.

2. Minimum pipe sizes are calculated using the Manning's equation and are based on the flow rates with 30% factor to account for minor losses.

3. Refer to Drainage exhibit in MP2 for drainage node locations, Flow rates are based on Rational Method Hydrology in appendix B.

4. The Qs in this sizing table assumes the detained outflows from all detention basins. Some pipes have been upsized to convey undetained flows where the emergency overland overflow path (i.e. storm drain surcharging) is undesireable and could lead to damage to infrastructure.

HYDRAULIC ANALYSIS OF EXISTING STORM DRAIN BACKBONE ALONG BEYER BLVD.

STATE OF CALIFORNIA
BUSINESS AND TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

PROJECT PLANS FOR CONSTRUCTION ON STATE HIGHWAY

IN SAN DIEGO COUNTY IN AND NEAR SAN DIEGO AND CHULA VISTA
ON ROUTE 805 FROM ROUTE 5 TO 3.2 MILES NORTH OF ROUTE 5 AND
ON ROUTE 75 FROM 0.5 MILE EAST TO 0.3 MILE WEST OF ROUTE 805

To be supplemented by Standard Plans dated January 1971

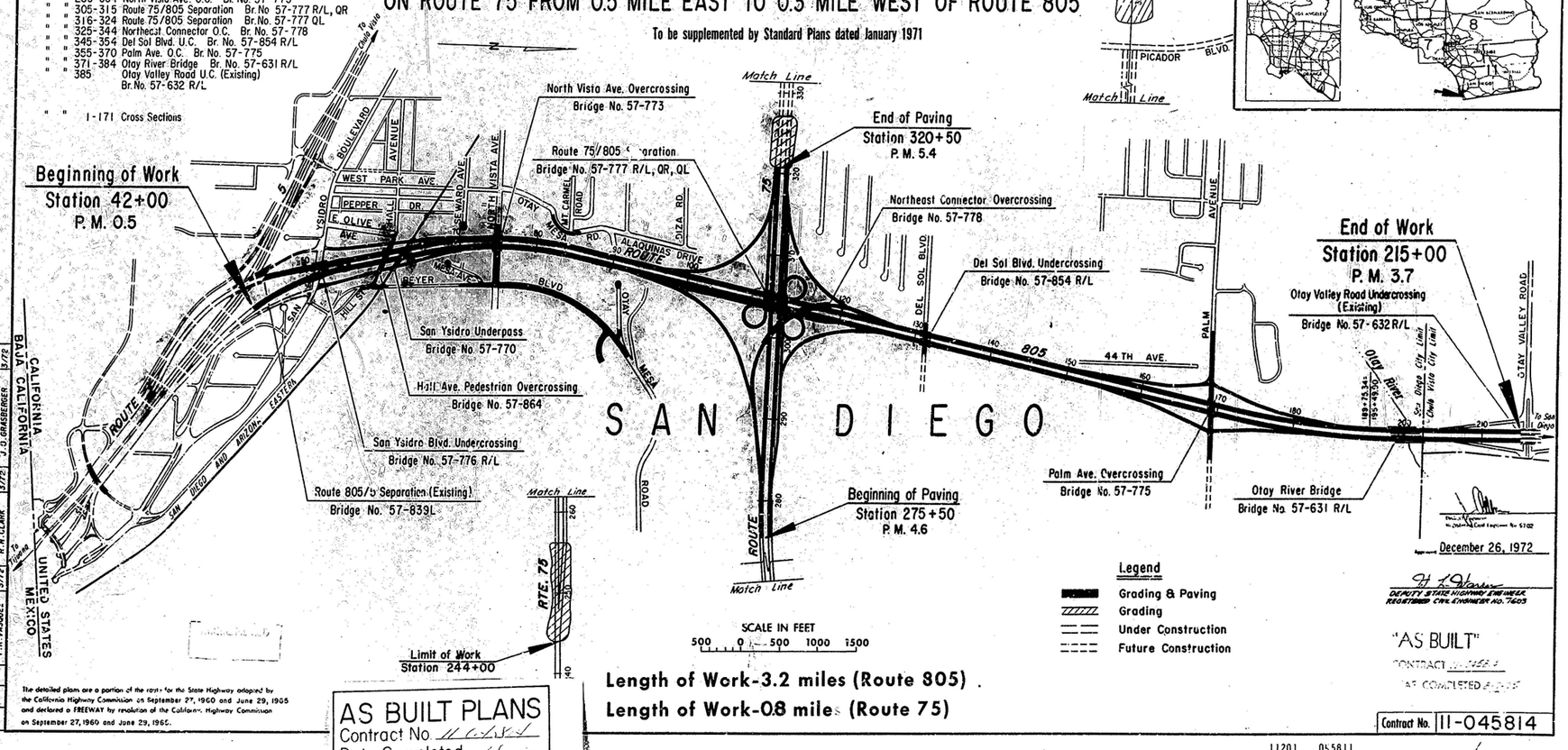
I - 805 - I(82)I

INDEX OF SHEETS

Sheet No.		
1		Title Sheet
"	2-3	Typical Cross Sections
"	4	Standard Plans List
"	5-21	Layout Plans
"	22-45	Profiles and Superelevation Diagrams
"	46-63	Grading and Drainage Plans
"	64-96	Drainage Profiles
"	97-105	Drainage and Channel Details (Note: SHEET 102)
"	106-114	Drainage List
"	115-118	Miscellaneous Construction Details
"	119-120	Construction Notes
"	121-134	Special Details
"	135-152	Utility Plans
"	153-172	Water and Sewer Relocations
"	173-226	Lighting, Signal and Sign Plans
"	227-249	Traffic Plans (Signs, Delineation, Markers)

BRIDGE PLANS

"	250	Route 805/5 Separation (Existing) Br. No. 57-839L
"	251-264	San Ysidro Blvd. U.C. Br. No. 57-776 R/L
"	265-275	Hall Ave. Pedestrian O.C. Br. No. 57-864
"	276-288	San Ysidro U.P. Br. No. 57-770
"	289-304	North Vista Ave. O.C. Br. No. 57-773
"	305-315	Route 75/805 Separation Br. No 57-777 R/L, QR
"	316-324	Route 75/805 Separation Br. No. 57-777 QL
"	325-344	Northeast Connector O.C. Br. No. 57-778
"	345-354	Del Sol Blvd. U.C. Br. No. 57-854 R/L
"	355-370	Palm Ave. O.C. Br. No. 57-775
"	371-384	Otay River Bridge Br. No. 57-631 R/L
"	385	Otay Valley Road U.C. (Existing) Br. No. 57-632 R/L
"	"	I-171 Cross Sections



Legend
- Grading & Paving
- Grading
- Under Construction
- Future Construction

Length of Work-3.2 miles (Route 805)
Length of Work-0.8 miles (Route 75)

DIST	COUNTY	ROUTE	POST MILE	TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	805	0.5-3.7	1	385	
	SD	75	4.6-5.4			

Designed by		Date	3/72	Alternate Recommended No.
Checked by		Date	3/72	Design Engineer J.O. GRASBERGER
Project Engineer	T.R. VASQUEZ	Date	3/72	Design Engineer R.H. CLARK

The detailed plans are a portion of the route for the State Highway adopted by the California Highway Commission on September 27, 1960 and June 29, 1965 and declared a FREEWAY by resolution of the California Highway Commission on September 27, 1960 and June 29, 1965.

December 26, 1972

H. L. Stevens
DEPUTY STATE HIGHWAY ENGINEER
REGISTERED CIVIL ENGINEER NO. 7605

"AS BUILT"
CONTRACT ... USER ...
AS COMPLETED ...

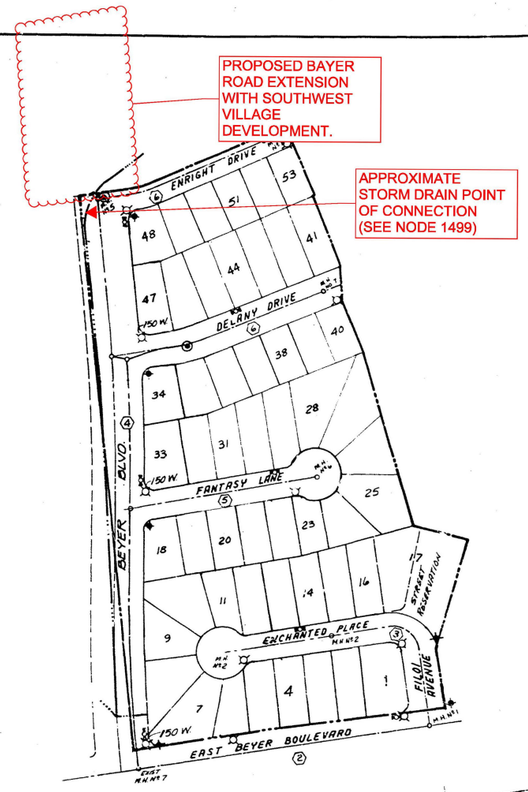
Contract No. 11-045814

11201 045811

AS BUILT PLANS
Contract No. 11-045814
Date Completed ...
Document No. ...

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE ... UNDER MY DIRECTION AND CONTROL ... AS SHOWN ON THE ORIGINAL ...

MICROFILM STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION MICROFILM



SCALE 1" = 100'

- INDICATES CONTROL MONUMENTS
- INDICATES STREET NAME SIGN
- INDICATES FIRE HYDRANT
- INDICATES STREET LIGHT SYSTEM
- INDICATES SEWER MAIN & MANHOLE
- INDICATES IMPROVEMENT PLAN SHEET NO.
- INDICATES STORM DRAIN

KEY MAP SYMBOLS

	ADT	
BEYER BOULEVARD	20,000	{4" A.C. ON 10" C.T.B.
EAST BEYER BOULEVARD	10,000	{4" A.C. ON 10" C.T.B.
ENCHANTED PLACE	CUL-DE-SAC	{2" A.C. ON 5" C.T.B.
FANTASY LANE	CUL-DE-SAC	{2" A.C. ON 5" C.T.B.
FILOLI AVENUE	CUL-DE-SAC	{2" A.C. ON 5" C.T.B.
ENRIGHT DRIVE	LOCAL	{2" A.C. ON 5" C.T.B.
DELANY DRIVE	2000	{2" A.C. ON 5" C.T.B.

GENERAL NOTES

1. WHERE NEW UNDERGROUND CONNECTS TO EXISTING WORK IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE LOCATIONS AND ELEVATION OF EXISTING WORK PRIOR TO EXCAVATION FOR NEW WORK AND TO CONNECT THE NEW WORK THERETO.
2. PRIOR TO MIXING WITH CEMENT AND WATER, ALL MINERAL AGGREGATE USED FOR THE PRODUCTION OF CEMENT TREATED BASE SHALL HAVE A SAND EQUIVALENT OF NOT LESS THAN 30, WHEN TESTED BY CALIFORNIA DIVISION OF HIGHWAYS TEST METHOD NUMBER CALIFORNIA 217.
3. CONTRACTORS MAKING ANY TYPE OF EXCAVATION ON THIS PROJECT AFTER ROUGH GRADE AND PRIOR TO FINISH GRADE SHALL REMOVE FROM THE SITE OR TO AREA DESIGNATED BY ENGINEER OF WORK, ALL EXCAVATION MATERIAL EXCEPT THAT USED AS COMPACTED BACKFILL IN SUCH EXCAVATION.
4. THE CONTRACTOR SHALL VERIFY THE LOCATION OF AND PROTECT ALL EXISTING IMPROVEMENTS BEFORE AND DURING CONSTRUCTION.
5. TOP OF STORM DRAIN BOXES SHALL BE CONSTRUCTED CONCURRENT WITH ADJOINING CURBS AND GUTTERS.
6. ALL STRUCTURES IN STREET RIGHT OF WAY SHALL BE KEPT AT LEAST 12" BELOW FINISH GRADE UNTIL CURBS, SIDEWALK AND PAVEMENT ARE INSTALLED AND SHALL THEN BE ADJUSTED TO FINISH GRADE.
7. PROVIDE ADEQUATE PROTECTION - CRASH POST, TYPE "G" CURB - PEDESTAL, FOR FIRE HYDRANTS IN ROLLED CURB AREAS - SEE DETAIL. FLANGE SHALL BE ABOVE PEDESTAL.
8. ENGINEER'S GRADE STAKES SHALL BE PROVIDED ON PARTIAL OPEN STREETS BEFORE PAVING BEGINS.
9. ELECTRICAL & TELEPHONE SERVICE FACILITIES SHALL BE INSTALLED UNDERGROUND IN ACCORDANCE WITH SECTION 102.0404 OF THE MUNICIPAL CODE AND SUBDIVISION BOARD RESOLUTION NO. 264
   THERE ARE EXISTING 12 KVA OVERHEAD LINES ALONG WESTERN EDGE THIS SUBDIVISION TO BE UNDERGROUNDED.
10. ALL UNDERGROUND UTILITIES & LATERALS TO BE INSTALLED BEFORE CONSTRUCTION OF CURBS OR CONCRETE
11. CROSS-GUTTERS OR SURFACING OF STREETS.
    CONTRACTOR SHALL VERIFY LOCATIONS OF DRIVEWAYS AND SHALL CONSTRUCT DRIVEWAY DEPRESSION CONCURRENT WITH CURB CONSTRUCTION FOR EACH LOT. STANDARD DRAWING NUMBERS G-14, G-16, G-15

WATER AND SEWER NOTES

1. THE WATER AND SEWER FACILITIES SHOWN ON THESE PLANS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE WATER UTILITIES DIRECTOR.
2. EACH BUILDING SHALL RECEIVE A 1-INCH WATER SERVICE AND 4-INCH SEWER HOUSE CONNECTION. LOCATION TO BE DETERMINED IN THE FIELD BY THE ENGINEER OF WORK. THE "AS BUILT" LOCATIONS SHALL BE SHOWN ON THESE PLANS AND THE SEWER LATERAL TABLE COMPLETED PRIOR TO ACCEPTANCE OF THE WATER AND SEWER FACILITIES.
3. WATER SERVICES, SEWER LATERALS AND FIRE HYDRANT SERVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE STANDARD DRAWINGS. THE LOCATION OF WATER AND SEWER FACILITIES SHOWN ON THESE PLANS SHALL TAKE PRECEDENCE IN CASE OF CONFLICTS WITH OTHER UTILITIES NOT SHOWN HEREON.
4. SUBSTITUTION OF MATERIALS FOR CONSTRUCTION OF WATER AND SEWER FACILITIES WILL NOT BE ALLOWED UNLESS APPROVED BY THE WATER UTILITIES DIRECTOR.
5. LOCATE WATER SERVICES AND SEWER HOUSE CONNECTIONS OUT OF DRIVEWAYS. THE SEWER HOUSE CONNECTION SHALL BE A MINIMUM 5' DISTANCE DOWNSTREAM FROM THE WATER SERVICE.
6. WHERE SEWER LATERALS CROSS THE CURB LINE, A LETTER "S" SHALL BE STAMPED OR CHISELED IN THE CURB FACE (1-1/2-INCHES HIGH AND 3/16-INCHES DEEP).
7. COVER OVER WATER MAIN IS TO BE 3' UNLESS OTHER IS CALLED OUT. IF OVER 5' OF COVER AND LESS THAN 2.5', A.C. MAIN IS NOT ACCEPTABLE.
8. SEWER LATERALS ARE TO BE SPACED SO THERE IS ONLY ONE CONNECTION IN ANY ONE PIPE LENGTH. DOUBLE WYES ARE NOT TO BE USED.
9. OPEN ENDS OF ALL SEWER MAINS AND SEWER LATERALS SHALL BE PLUGGED WITH P.V.C. PLUGS
10. ALL LATERALS WITH LESS THAN 4-FOOT COVER TO INVERT BE CONCRETE ENCASED.
11. ALL SEWER MAINS AND LATERALS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT SEWER AGENCY AND STREET AGENCY STANDARDS FOR SEWER CONSTRUCTION AND SAID STANDARDS WILL GOVERN ALL SEWER TRENCH BACKFILL.
12. SUBSTITUTION OF MATERIALS FOR CONSTRUCTION OF WATER AND SEWER FACILITIES SHALL NOT BE ALLOWED UNLESS APPROVED BY THE WATER UTILITIES DIRECTOR.
13. ALL WATER MAINS SHALL BE CLASS 150 UNLESS OTHERWISE NOTED.
14. ALL MANHOLE COVERS, GATE VALVE COVERS AND STREET MONUMENTS SHALL BE ADJUSTED TO FINISH GRADE. (NEW OR EXISTING).
15. PRESSURE REGULATORS REQUIRED ON WATER SERVICES.
16. BYPASS REQUIRED ON 12" AND 16" GATE VALVES.

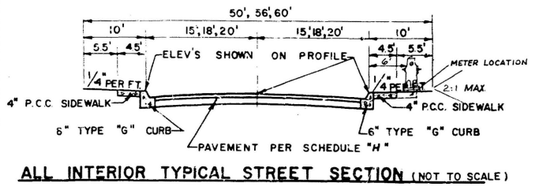
TELEPHONE, GAS & ELECTRIC NOTES

1. NOTICE: ALL TELEPHONE SERVICES WITH THIS SUBDIVISION ARE "UNDERGROUND INSTALLATION". FOR LOCATION OF CABLES AND APPURTENANCES CONTACT THE PACIFIC TELEPHONE & TELEGRAPH CO.
2. NOTICE: ALL ELECTRICAL AND GAS SERVICES WITHIN THIS SUBDIVISION ARE "UNDERGROUND INSTALLATION". FOR LOCATION OF ELECTRICAL CABLES AND GAS PIPING AND APPURTENANCES, CONTACT SAN DIEGO GAS & ELECTRIC COMPANY.

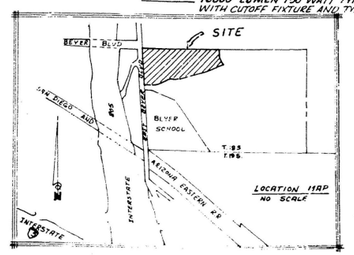
STREET LIGHT NOTES

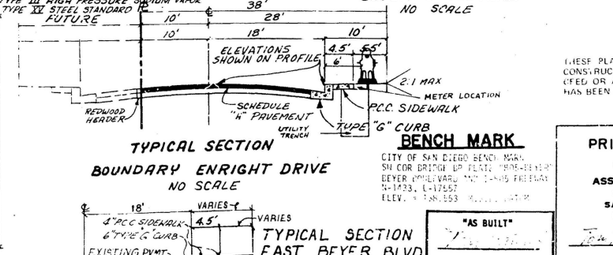
1. CONTRACTOR INSTALLING THE STREET LIGHTING DISTRIBUTION SYSTEM SHALL NOTIFY FIELD ENGINEER, , PHONE 236-5520 A MINIMUM OF 3 DAYS BEFORE BEGINNING OF WORK FOR APPROVAL OF CONDUIT LOCATION AND REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL STREET LIGHTS ARE BURNING AND NOTIFY FIELD ENGINEER, , PHONE 236-5520 A MINIMUM OF 4 WEEKS AFTER FINAL ELECTRICAL INSPECTION.

8 — 9500 LUMEN 100 WATT TYPE III HIGH PRESSURE SODIUM VAPOR WITH CUTOFF FIXTURE
3 — 16000 LUMEN 150 WATT TYPE III HIGH PRESSURE SODIUM VAPOR WITH CUTOFF FIXTURE AND TYPE XX STEEL STANDARD



ALL INTERIOR TYPICAL STREET SECTION (NOT TO SCALE)





TYPICAL SECTION
BOUNDARY ENRIGHT DRIVE
NO SCALE

TYPICAL SECTION
EAST BEYER BLVD.
NO SCALE

SOILS REPORT

WILLIAM S. KROOSKOS & ASSOCIATES
REPORT DATED JULY 21, 1977
PROJECT NO. 77-5343

STORM DRAIN ALTERNATES

ALTERNATE NO 1 - ASBESTOS CEMENT DRAIN PIPE, SPECIAL PROVISION P-21 SHALL GOVERN. (A.C.P. SHALL BE 2000-D)

ALTERNATE NO 2 CAST IN PLACE CONCRETE PIPE, SPECIAL PROVISION P-16 SHALL GOVERN.

REFERENCE DRAWINGS

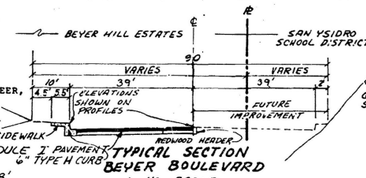
OTAY MESA SEWER AND SAN YSIDRO SCHOOL DISTRICT WATER MAIN DWGS: 16864-1-D, 16864-2-D, AND 16864-3-D.

WATER CONNECTIONS

CONNECTION NO. 1 - $2000.00

SITE DEVELOPMENT

GRADING - SHEETS 9 & 10
LANDSCAPING - SHEETS 9 & 11
IRRIGATION - SHEETS 9 & 11
EXCAVATION = 24,500 C.Y.
EMBANKMENT = 150,000 C.Y.
(IMPORT) = 125,500 C.Y.



TYPICAL SECTION
BEYER BOULEVARD
NO SCALE

BENCH MARK

CITY OF SAN DIEGO BENCH MARK SW COR BRIDGE OF FLAT TOP CONCRETE BEYER BOULEVARD AND DENIS FREELAND N-1423, L-17557
ELEV. = 520.553

"AS BUILT"
DATE:

PRIVATE CONTRACT
ENGINEER OF WORK
ASSOCIATED ENGINEERS
3904 GROTON STREET
SAN DIEGO, CALIF. 92110
PHONE (714) 224-2467
Tom Smith RCE 25900
DATE 20 Sept 1978

THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION UNTIL THE NOTICE TO PROCEED OR A BONDED SUBDIVISION PERMIT HAS BEEN ISSUED BY THE CITY ENGINEER.

WORK TO BE DONE

The Improvements consist of the following work to be done according to these plans and the Specifications and Standard Drawings of the City of San Diego.

SPECIFICATIONS

(1) Green Book Standard Specifications (1976 Ed.) Document No. 755163 filed May 10, 1976, and
(2) City of San Diego Standard Special Provisions, Document No. 758403, filed February 25, 1977.

STANDARD DRAWINGS

(1) City of San Diego Standard Drawings (1977 Ed.) Document No. 758672 filed March 21, 1977, and
(2) ( )* Denotes City of San Diego Standard Drawing per Document No. 735691, filed April 26, 1971.

IMPROVEMENTS	STD. DWG. NO.	SYMBOL
A.C. PAVEMENT	(G-58)*(G-59-T)*	
TYPE "G" CURB	G-2	
PAVEMENT CUTOFF WALL	G-22	
CROSS GUTTER	G-12	
SIDEWALK	G 7	
PEDESTRIAN RAMP	SD G-101	
A.C. BERM	G -5	6" B-1
CONTROL MONUMENT (3)	(M-21-T)*	
DRIVEWAY	G -14	
2" A.C.		
SEWER MAIN (JOHNS-MANVILLE)	S-4, S-5	8" P.V.C.
SEWER CONCRETE MANHOLE	S-1, M-3 (SEE DETAIL SHT.)	M.H.
4" P.V.C. SEWER HOUSE CONNECTION	S-13	
CONCRETE CRADLE FOR SEWERS	S-6	
CUT OFF WALL	S-10	
WATER MAIN (TYLER FITTINGS / JOHNS-MANVILLE)	W 21, W-17, W-18, W-20	8" A.C.
1" COPPER WATER SERVICE	(W-2)*, W-15-B2, (W-27)*	
GATE VALVE AND BOX W/BYPASS 12"&16" G.V. GATE VALVE COVER ONLY	SDW 109, W-19-A, W-12-B, (W-26)* I-27	8" G.V.
FIRE HYDRANT ASSEMBLY	W-10, W-11-A	F.H.
BLOW-OFF ASSEMBLY	SDW-102	B.O.
MULTI SERVICE FITTING 2" AIR VALVE	(W-60)* (W-13)*	2" A.V.
STORM DRAIN	D-60	
CURB INLET TYPE B, B-1	D-2	
GRAVITY HEADWALL	D-32	
STORM DRAIN CLEAN OUT	D-9, D-10	
CONCRETE LUG	D-63	
WING TYPE HEADWALL	D-35	
CURB OUTLET A & B	D-25	
STREET NAME SIGN	SDM-102, SDM-103	
STREET LIGHT SYSTEM	E-1, E-2, E-4	
BARRICADES AND GUARD POST	M-9	

MAINTAINING TRAFFIC. THE CONTRACTOR SHALL MAINTAIN ONE LANE OF TRAFFIC IN EACH DIRECTION DURING WORKING HOURS OF 8:30 AM TO 3:30 PM AND SHALL MAINTAIN FULL WIDTH OF TRAVEL LANES OF EXISTING ROADWAY DURING THE HOURS OF 3:30 PM AND 8:30 AM. ON SATURDAY, SUNDAY, AND DESIGNATED LEGAL HOLIDAYS, AND WHEN CONSTRUCTION OPERATIONS ARE NOT ACTIVELY IN PROGRESS ON WORKING DAYS THE CONTRACTOR SHALL MAINTAIN ALL TRAVEL LANES OF THE ROADWAY. ANY DEVIATION OF THESE REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 7-10.3 OF THE STANDARD SPECIFICATIONS.

PLANS FOR THE PUBLIC IMPROVEMENTS IN AND ADJOINING
BEYER HILL ESTATES

CITY OF SAN DIEGO, CALIFORNIA — SHEET 1 OF 11 SHEETS — T.M. 77-219 W.O. 70772 NO

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
AS BUILT				

C.E. Lockwood 12-4-78 — Jim Myrtle 12-6-78
CONTROL 142-1755
CONTRACTOR GEN-HALL DATE STARTED 2-16-79
INSPECTOR CE EBA/DAVE DATE COMPLETED 12-28-80
17793-1-D

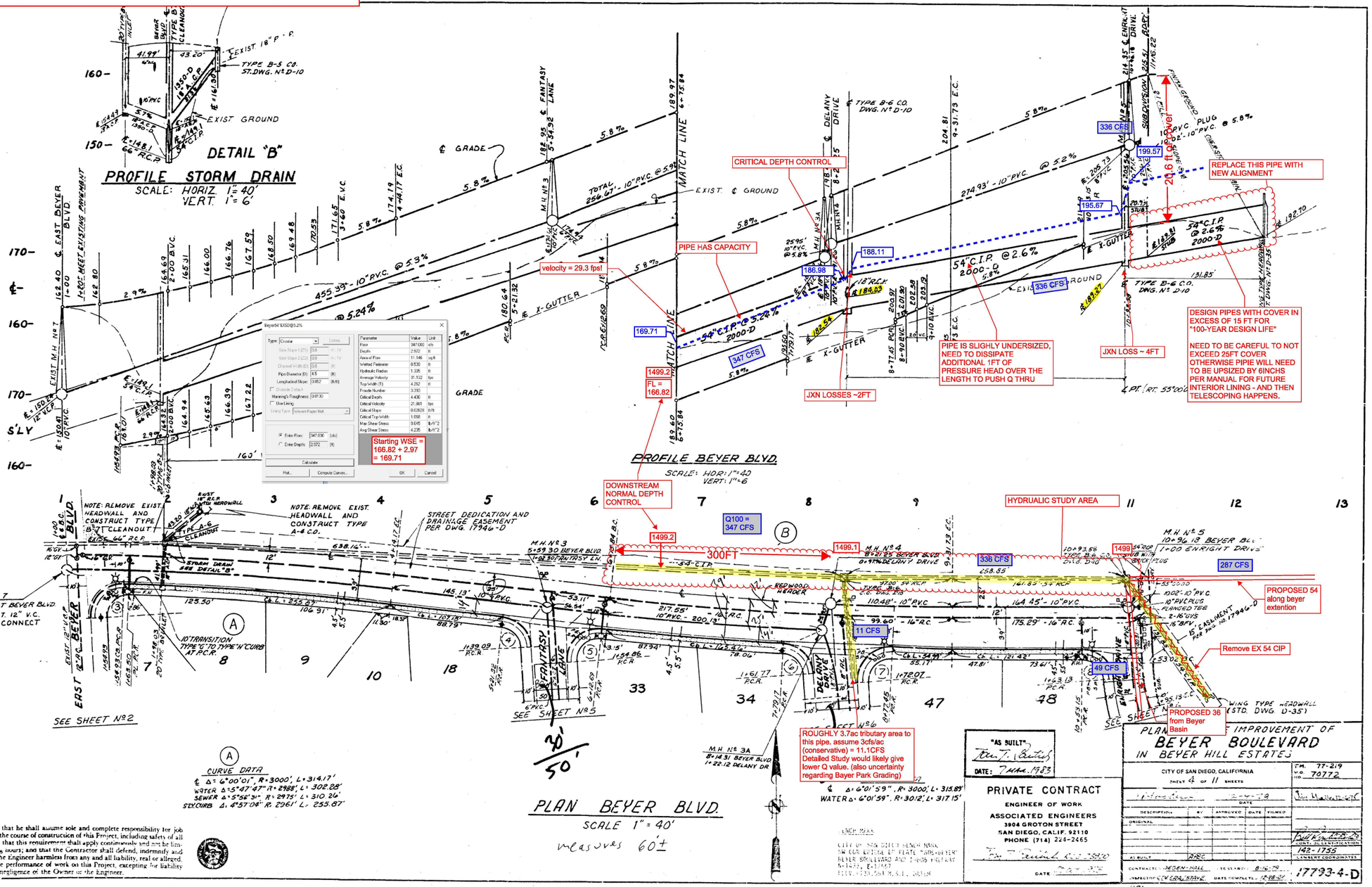
1131

0 1 2 3 4 IN.

DATUM IS BELIEVED TO BE NGVD29. PLANS DATE = 1979

ALL ELEVATIONS ON THIS SHEET (CALCULATED AND ORIGINAL) ARE IN NGVD29

ELEVATIONS TO BE SHIFTED UPWARDS 2.3 FT FOR NAVD88



Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this Project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this Project, excepting for liability arising from the sole negligence of the Owner or the Engineer.

APPENDIX F

Detention Analysis

```
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                    *          609 SECOND STREET           *
 *                                      *                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   06JUL20  TIME  16:44:53  *                    *           (916) 756-1104             *
 *                                      *                    *                                      *
 ****************************************                    ****************************************
```

Detention Routing Calculation for Basin 100

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

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

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


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

 *** FREE ***
                         *DIAGRAM
              1          ID   SOUTH OTAY VTM; J-15013-C
              2          ID   PRELIMINARY DETENTION ANALYSIS FOR BASIN 1
              3          ID   FEBRUARY 28, 2019 - FILE NAME: SWV1HD00.hc1
              4          IT       1 01JAN90    1200     300
              5          IO       5       0
                         *

              6          KKSWVHD100.hc1
              7          KM   RUN DATE   7/6/2020
              8          KM   RATIONAL METHOD HYDROGRAPH PROGRAM
              9          KM   COPYRIGHT 1992, 2014, RICK ENGINEERING COMPANY
             10          KM   6HR RAINFALL IS 2 INCHES
             11          KM   RATIONAL METHOD RUNOFF COEFFICIENT IS 0.77
             12          KM   RATIONAL METHOD TIME OF CONCENTRATION IS 13 MIN.
             13          KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
             14          KM   IT 2 01JAN90 1200 200
             15          BA  0.0084
             16          IN      13 01JAN90    1147
             17          QI       0       0     0.5     0.5     0.5     0.6     0.6     0.6     0.7     0.7
             18          QI     0.7     0.8     0.9     0.9     1.1     1.1     1.4     1.6     2.3     0.9
             19          QI    14.2     1.9     1.3       1     0.8     0.7     0.6     0.6     0.5       0
             20          QI       0       0       0       0       0       0       0       0       0       0
             21          QI
                         *

             22          KK    DET1
             23          KO       2       2       0       0      21
             24          KM   BMP 1
             25          RS       1    STOR      -1
             26          SV       0   0.424   0.425   0.426
             27          SQ       0     4.6     7.1     8.7
             28          SE     100     101     102     103
                         *
             29          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6    SWVHD100
                  V
                  V
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*************************************                                  *************************************
 *                                   *                                  *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                              *    U.S. ARMY CORPS OF ENGINEERS     *
 *              JUN   1998           *                                  *    HYDROLOGIC ENGINEERING CENTER    *
 *            VERSION 4.1            *                                  *          609 SECOND STREET          *
 *                                   *                                  *       DAVIS, CALIFORNIA 95616       *
 *  RUN DATE   06JUL20  TIME  16:44:53   *                              *           (916) 756-1104            *
 *                                   *                                  *                                   *
 *************************************                                  *************************************
```

SOUTH OTAY VTM; J-15013-C
PRELIMINARY DETENTION ANALYSIS FOR BASIN 1
FEBRUARY 28, 2019 - FILE NAME: SWV1HD00.hc1

```
  5 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           1  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN90  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1JAN90  ENDING DATE
                     NDTIME        1659  ENDING TIME
                     ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL     .02 HOURS
                     TOTAL TIME BASE    4.98 HOURS

        ENGLISH UNITS
             DRAINAGE AREA         SQUARE MILES
             PRECIPITATION DEPTH   INCHES
             LENGTH, ELEVATION     FEET
             FLOW                  CUBIC FEET PER SECOND
             STORAGE VOLUME        ACRE-FEET
             SURFACE AREA          ACRES
             TEMPERATURE           DEGREES FAHRENHEIT


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


          **************
          *            *
 22 KK    *      DET1  *
          *            *
          **************

 23 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           2  PRINT CONTROL
                      IPLOT           2  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         300  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .017  TIME INTERVAL IN HOURS

                         BMP 1

            HYDROGRAPH ROUTING DATA

 25 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        STOR  TYPE OF INITIAL CONDITION
                     RSVRIC       -1.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 26 SV            STORAGE          .0        .4        .4        .4

 27 SQ          DISCHARGE          0.        5.        7.        9.

 28 SE          ELEVATION      100.00    101.00    102.00    103.00
```

***

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 5. TO 9.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION DET1

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JAN	1200	1	0.	.0	100.0	1	JAN	1340	101	0.	.0	100.1	1	JAN	1520	201	1.	.1	100.2
1	JAN	1201	2	0.	.0	100.0	1	JAN	1341	102	0.	.0	100.1	1	JAN	1521	202	1.	.1	100.2
1	JAN	1202	3	0.	.0	100.0	1	JAN	1342	103	0.	.0	100.1	1	JAN	1522	203	1.	.1	100.2
1	JAN	1203	4	0.	.0	100.0	1	JAN	1343	104	0.	.0	100.1	1	JAN	1523	204	1.	.1	100.2
1	JAN	1204	5	0.	.0	100.0	1	JAN	1344	105	0.	.0	100.1	1	JAN	1524	205	1.	.1	100.2
1	JAN	1205	6	0.	.0	100.0	1	JAN	1345	106	0.	.0	100.1	1	JAN	1525	206	1.	.1	100.2
1	JAN	1206	7	0.	.0	100.0	1	JAN	1346	107	0.	.0	100.1	1	JAN	1526	207	1.	.1	100.2
1	JAN	1207	8	0.	.0	100.0	1	JAN	1347	108	0.	.0	100.1	1	JAN	1527	208	1.	.1	100.2
1	JAN	1208	9	0.	.0	100.0	1	JAN	1348	109	0.	.0	100.1	1	JAN	1528	209	1.	.1	100.2
1	JAN	1209	10	0.	.0	100.0	1	JAN	1349	110	0.	.0	100.1	1	JAN	1529	210	1.	.1	100.2
1	JAN	1210	11	0.	.0	100.0	1	JAN	1350	111	0.	.0	100.1	1	JAN	1530	211	1.	.1	100.2
1	JAN	1211	12	0.	.0	100.0	1	JAN	1351	112	0.	.0	100.1	1	JAN	1531	212	1.	.1	100.2
1	JAN	1212	13	0.	.0	100.0	1	JAN	1352	113	0.	.0	100.1	1	JAN	1532	213	1.	.1	100.2
1	JAN	1213	14	0.	.0	100.0	1	JAN	1353	114	0.	.0	100.1	1	JAN	1533	214	1.	.1	100.2
1	JAN	1214	15	0.	.0	100.0	1	JAN	1354	115	0.	.0	100.1	1	JAN	1534	215	1.	.1	100.2
1	JAN	1215	16	0.	.0	100.0	1	JAN	1355	116	1.	.0	100.1	1	JAN	1535	216	1.	.1	100.2
1	JAN	1216	17	0.	.0	100.0	1	JAN	1356	117	1.	.0	100.1	1	JAN	1536	217	1.	.1	100.2
1	JAN	1217	18	0.	.0	100.0	1	JAN	1357	118	1.	.0	100.1	1	JAN	1537	218	1.	.1	100.2
1	JAN	1218	19	0.	.0	100.0	1	JAN	1358	119	1.	.0	100.1	1	JAN	1538	219	1.	.1	100.2
1	JAN	1219	20	0.	.0	100.0	1	JAN	1359	120	1.	.0	100.1	1	JAN	1539	220	1.	.1	100.2
1	JAN	1220	21	0.	.0	100.0	1	JAN	1400	121	1.	.0	100.1	1	JAN	1540	221	1.	.1	100.2
1	JAN	1221	22	0.	.0	100.0	1	JAN	1401	122	1.	.0	100.1	1	JAN	1541	222	1.	.1	100.3
1	JAN	1222	23	0.	.0	100.0	1	JAN	1402	123	1.	.0	100.1	1	JAN	1542	223	1.	.1	100.3
1	JAN	1223	24	0.	.0	100.0	1	JAN	1403	124	1.	.0	100.1	1	JAN	1543	224	1.	.1	100.3
1	JAN	1224	25	0.	.0	100.0	1	JAN	1404	125	1.	.0	100.1	1	JAN	1544	225	1.	.1	100.3
1	JAN	1225	26	0.	.0	100.0	1	JAN	1405	126	1.	.0	100.1	1	JAN	1545	226	1.	.1	100.3
1	JAN	1226	27	0.	.0	100.0	1	JAN	1406	127	1.	.0	100.1	1	JAN	1546	227	1.	.1	100.3
1	JAN	1227	28	0.	.0	100.0	1	JAN	1407	128	1.	.0	100.1	1	JAN	1547	228	1.	.1	100.3
1	JAN	1228	29	0.	.0	100.0	1	JAN	1408	129	1.	.1	100.1	1	JAN	1548	229	1.	.1	100.3
1	JAN	1229	30	0.	.0	100.0	1	JAN	1409	130	1.	.1	100.1	1	JAN	1549	230	1.	.1	100.3
1	JAN	1230	31	0.	.0	100.0	1	JAN	1410	131	1.	.1	100.1	1	JAN	1550	231	1.	.1	100.3
1	JAN	1231	32	0.	.0	100.0	1	JAN	1411	132	1.	.1	100.1	1	JAN	1551	232	1.	.1	100.3
1	JAN	1232	33	0.	.0	100.0	1	JAN	1412	133	1.	.1	100.1	1	JAN	1552	233	1.	.1	100.3
1	JAN	1233	34	0.	.0	100.0	1	JAN	1413	134	1.	.1	100.1	1	JAN	1553	234	1.	.1	100.3
1	JAN	1234	35	0.	.0	100.0	1	JAN	1414	135	1.	.1	100.1	1	JAN	1554	235	1.	.1	100.3
1	JAN	1235	36	0.	.0	100.0	1	JAN	1415	136	1.	.1	100.1	1	JAN	1555	236	1.	.1	100.3
1	JAN	1236	37	0.	.0	100.0	1	JAN	1416	137	1.	.1	100.1	1	JAN	1556	237	1.	.1	100.3
1	JAN	1237	38	0.	.0	100.0	1	JAN	1417	138	1.	.1	100.1	1	JAN	1557	238	1.	.1	100.3
1	JAN	1238	39	0.	.0	100.0	1	JAN	1418	139	1.	.1	100.1	1	JAN	1558	239	1.	.1	100.3
1	JAN	1239	40	0.	.0	100.0	1	JAN	1419	140	1.	.1	100.1	1	JAN	1559	240	1.	.1	100.3
1	JAN	1240	41	0.	.0	100.0	1	JAN	1420	141	1.	.1	100.1	1	JAN	1600	241	1.	.1	100.3
1	JAN	1241	42	0.	.0	100.0	1	JAN	1421	142	1.	.1	100.1	1	JAN	1601	242	2.	.1	100.3
1	JAN	1242	43	0.	.0	100.0	1	JAN	1422	143	1.	.1	100.1	1	JAN	1602	243	2.	.2	100.4
1	JAN	1243	44	0.	.0	100.0	1	JAN	1423	144	1.	.1	100.1	1	JAN	1603	244	2.	.2	100.4
1	JAN	1244	45	0.	.0	100.0	1	JAN	1424	145	1.	.1	100.1	1	JAN	1604	245	2.	.2	100.4
1	JAN	1245	46	0.	.0	100.0	1	JAN	1425	146	1.	.1	100.1	1	JAN	1605	246	2.	.2	100.4
1	JAN	1246	47	0.	.0	100.0	1	JAN	1426	147	1.	.1	100.1	1	JAN	1606	247	2.	.2	100.5
1	JAN	1247	48	0.	.0	100.1	1	JAN	1427	148	1.	.1	100.1	1	JAN	1607	248	2.	.2	100.5
1	JAN	1248	49	0.	.0	100.1	1	JAN	1428	149	1.	.1	100.1	1	JAN	1608	249	3.	.2	100.6
1	JAN	1249	50	0.	.0	100.1	1	JAN	1429	150	1.	.1	100.1	1	JAN	1609	250	3.	.2	100.6
1	JAN	1250	51	0.	.0	100.1	1	JAN	1430	151	1.	.1	100.1	1	JAN	1610	251	3.	.3	100.6
1	JAN	1251	52	0.	.0	100.1	1	JAN	1431	152	1.	.1	100.1	1	JAN	1611	252	3.	.3	100.6
1	JAN	1252	53	0.	.0	100.1	1	JAN	1432	153	1.	.1	100.1	1	JAN	1612	253	3.	.3	100.7
1	JAN	1253	54	0.	.0	100.1	1	JAN	1433	154	1.	.1	100.1	1	JAN	1613	254	3.	.3	100.7
1	JAN	1254	55	0.	.0	100.1	1	JAN	1434	155	1.	.1	100.1	1	JAN	1614	255	3.	.3	100.7
1	JAN	1255	56	0.	.0	100.1	1	JAN	1435	156	1.	.1	100.1	1	JAN	1615	256	3.	.3	100.7
1	JAN	1256	57	0.	.0	100.1	1	JAN	1436	157	1.	.1	100.1	1	JAN	1616	257	3.	.3	100.7
1	JAN	1257	58	0.	.0	100.1	1	JAN	1437	158	1.	.1	100.1	1	JAN	1617	258	3.	.3	100.7
1	JAN	1258	59	0.	.0	100.1	1	JAN	1438	159	1.	.1	100.1	1	JAN	1618	259	3.	.3	100.7
1	JAN	1259	60	0.	.0	100.1	1	JAN	1439	160	1.	.1	100.1	1	JAN	1619	260	3.	.3	100.7
1	JAN	1300	61	0.	.0	100.1	1	JAN	1440	161	1.	.1	100.1	1	JAN	1620	261	3.	.3	100.7
1	JAN	1301	62	0.	.0	100.1	1	JAN	1441	162	1.	.1	100.1	1	JAN	1621	262	3.	.3	100.7
1	JAN	1302	63	0.	.0	100.1	1	JAN	1442	163	1.	.1	100.1	1	JAN	1622	263	3.	.3	100.7
1	JAN	1303	64	0.	.0	100.1	1	JAN	1443	164	1.	.1	100.1	1	JAN	1623	264	3.	.3	100.7
1	JAN	1304	65	0.	.0	100.1	1	JAN	1444	165	1.	.1	100.2	1	JAN	1624	265	3.	.3	100.7
1	JAN	1305	66	0.	.0	100.1	1	JAN	1445	166	1.	.1	100.2	1	JAN	1625	266	3.	.3	100.7
1	JAN	1306	67	0.	.0	100.1	1	JAN	1446	167	1.	.1	100.2	1	JAN	1626	267	3.	.3	100.7
1	JAN	1307	68	0.	.0	100.1	1	JAN	1447	168	1.	.1	100.2	1	JAN	1627	268	3.	.3	100.7
1	JAN	1308	69	0.	.0	100.1	1	JAN	1448	169	1.	.1	100.2	1	JAN	1628	269	3.	.3	100.7
1	JAN	1309	70	0.	.0	100.1	1	JAN	1449	170	1.	.1	100.2	1	JAN	1629	270	3.	.3	100.7

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   1 JAN 1310  71       0.       .0   100.1 *  1 JAN 1450 171       1.       .1   100.2 *  1 JAN 1630 271       3.       .3   100.7
   1 JAN 1311  72       0.       .0   100.1 *  1 JAN 1451 172       1.       .1   100.2 *  1 JAN 1631 272       3.       .3   100.7
   1 JAN 1312  73       0.       .0   100.1 *  1 JAN 1452 173       1.       .1   100.2 *  1 JAN 1632 273       3.       .3   100.7
   1 JAN 1313  74       0.       .0   100.1 *  1 JAN 1453 174       1.       .1   100.2 *  1 JAN 1633 274       3.       .3   100.7
   1 JAN 1314  75       0.       .0   100.1 *  1 JAN 1454 175       1.       .1   100.2 *  1 JAN 1634 275       3.       .3   100.7
   1 JAN 1315  76       0.       .0   100.1 *  1 JAN 1455 176       1.       .1   100.2 *  1 JAN 1635 276       3.       .3   100.6
   1 JAN 1316  77       0.       .0   100.1 *  1 JAN 1456 177       1.       .1   100.2 *  1 JAN 1636 277       3.       .3   100.6
   1 JAN 1317  78       0.       .0   100.1 *  1 JAN 1457 178       1.       .1   100.2 *  1 JAN 1637 278       3.       .3   100.6
   1 JAN 1318  79       0.       .0   100.1 *  1 JAN 1458 179       1.       .1   100.2 *  1 JAN 1638 279       3.       .3   100.6
   1 JAN 1319  80       0.       .0   100.1 *  1 JAN 1459 180       1.       .1   100.2 *  1 JAN 1639 280       3.       .3   100.6
   1 JAN 1320  81       0.       .0   100.1 *  1 JAN 1500 181       1.       .1   100.2 *  1 JAN 1640 281       3.       .3   100.6
   1 JAN 1321  82       0.       .0   100.1 *  1 JAN 1501 182       1.       .1   100.2 *  1 JAN 1641 282       3.       .3   100.6
   1 JAN 1322  83       0.       .0   100.1 *  1 JAN 1502 183       1.       .1   100.2 *  1 JAN 1642 283       3.       .3   100.6
   1 JAN 1323  84       0.       .0   100.1 *  1 JAN 1503 184       1.       .1   100.2 *  1 JAN 1643 284       3.       .3   100.6
   1 JAN 1324  85       0.       .0   100.1 *  1 JAN 1504 185       1.       .1   100.2 *  1 JAN 1644 285       3.       .3   100.6
   1 JAN 1325  86       0.       .0   100.1 *  1 JAN 1505 186       1.       .1   100.2 *  1 JAN 1645 286       3.       .3   100.6
   1 JAN 1326  87       0.       .0   100.1 *  1 JAN 1506 187       1.       .1   100.2 *  1 JAN 1646 287       3.       .2   100.6
   1 JAN 1327  88       0.       .0   100.1 *  1 JAN 1507 188       1.       .1   100.2 *  1 JAN 1647 288       3.       .2   100.6
   1 JAN 1328  89       0.       .0   100.1 *  1 JAN 1508 189       1.       .1   100.2 *  1 JAN 1648 289       3.       .2   100.6
   1 JAN 1329  90       0.       .0   100.1 *  1 JAN 1509 190       1.       .1   100.2 *  1 JAN 1649 290       3.       .2   100.6
   1 JAN 1330  91       0.       .0   100.1 *  1 JAN 1510 191       1.       .1   100.2 *  1 JAN 1650 291       3.       .2   100.6
   1 JAN 1331  92       0.       .0   100.1 *  1 JAN 1511 192       1.       .1   100.2 *  1 JAN 1651 292       3.       .2   100.6
   1 JAN 1332  93       0.       .0   100.1 *  1 JAN 1512 193       1.       .1   100.2 *  1 JAN 1652 293       3.       .2   100.6
   1 JAN 1333  94       0.       .0   100.1 *  1 JAN 1513 194       1.       .1   100.2 *  1 JAN 1653 294       3.       .2   100.5
   1 JAN 1334  95       0.       .0   100.1 *  1 JAN 1514 195       1.       .1   100.2 *  1 JAN 1654 295       3.       .2   100.5
   1 JAN 1335  96       0.       .0   100.1 *  1 JAN 1515 196       1.       .1   100.2 *  1 JAN 1655 296       2.       .2   100.5
   1 JAN 1336  97       0.       .0   100.1 *  1 JAN 1516 197       1.       .1   100.2 *  1 JAN 1656 297       2.       .2   100.5
   1 JAN 1337  98       0.       .0   100.1 *  1 JAN 1517 198       1.       .1   100.2 *  1 JAN 1657 298       2.       .2   100.5
   1 JAN 1338  99       0.       .0   100.1 *  1 JAN 1518 199       1.       .1   100.2 *  1 JAN 1658 299       2.       .2   100.5
   1 JAN 1339 100       0.       .0   100.1 *  1 JAN 1519 200       1.       .1   100.2 *  1 JAN 1659 300       2.       .2   100.5
                                              *                                           *
 ************************************************************************************************************************************************

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR      4.98-HR
+   (CFS)       (HR)
                        (CFS)
+       3.      4.30                 1.          1.          1.          1.
                          (INCHES)     .916        .916        .916        .916
                           (AC-FT)       0.          0.          0.          0.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR      4.98-HR
+  (AC-FT)      (HR)
        0.      4.30                 0.          0.          0.          0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR      4.98-HR
+   (FEET)      (HR)
    100.73      4.30              100.22      100.22      100.22       100.22

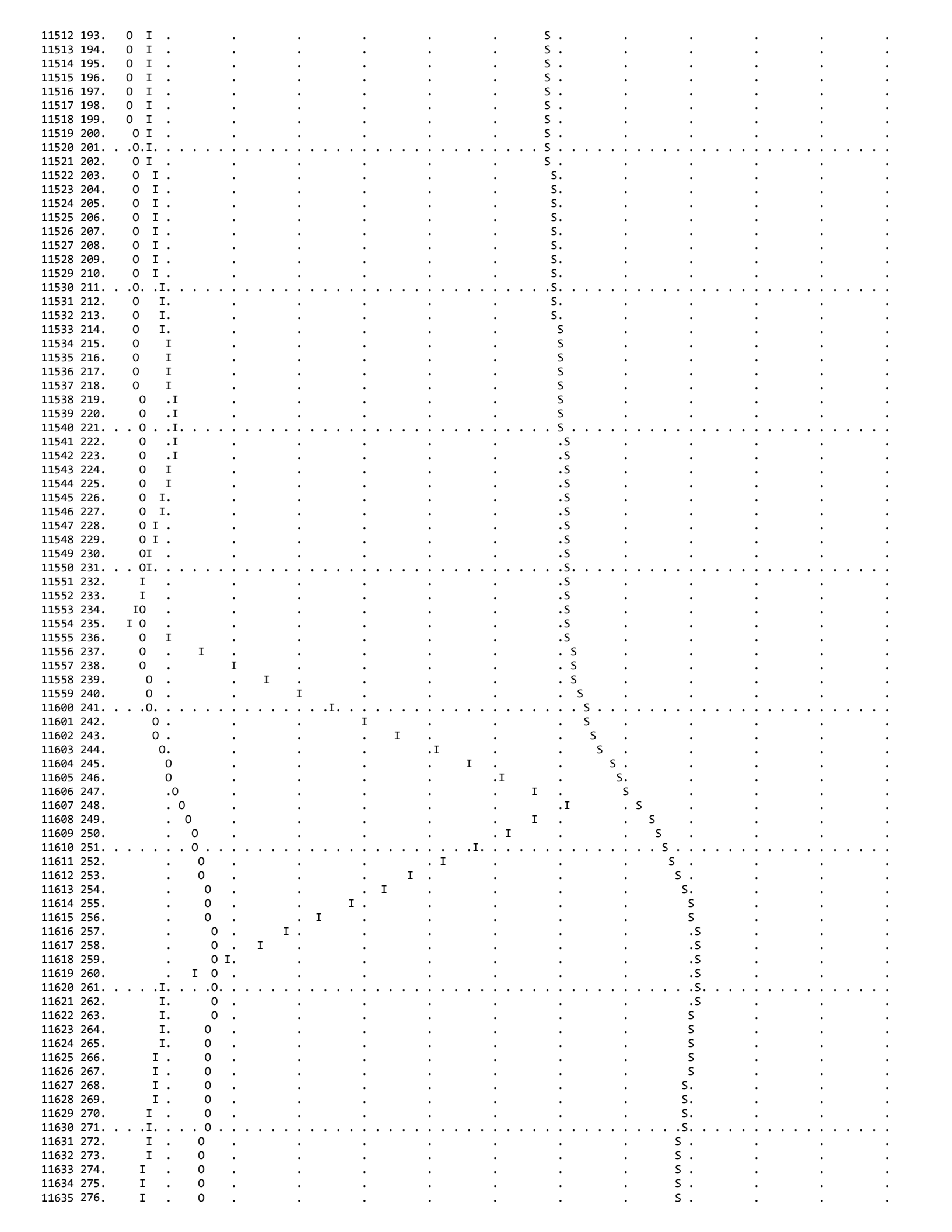
                         CUMULATIVE AREA =     .01 SQ MI

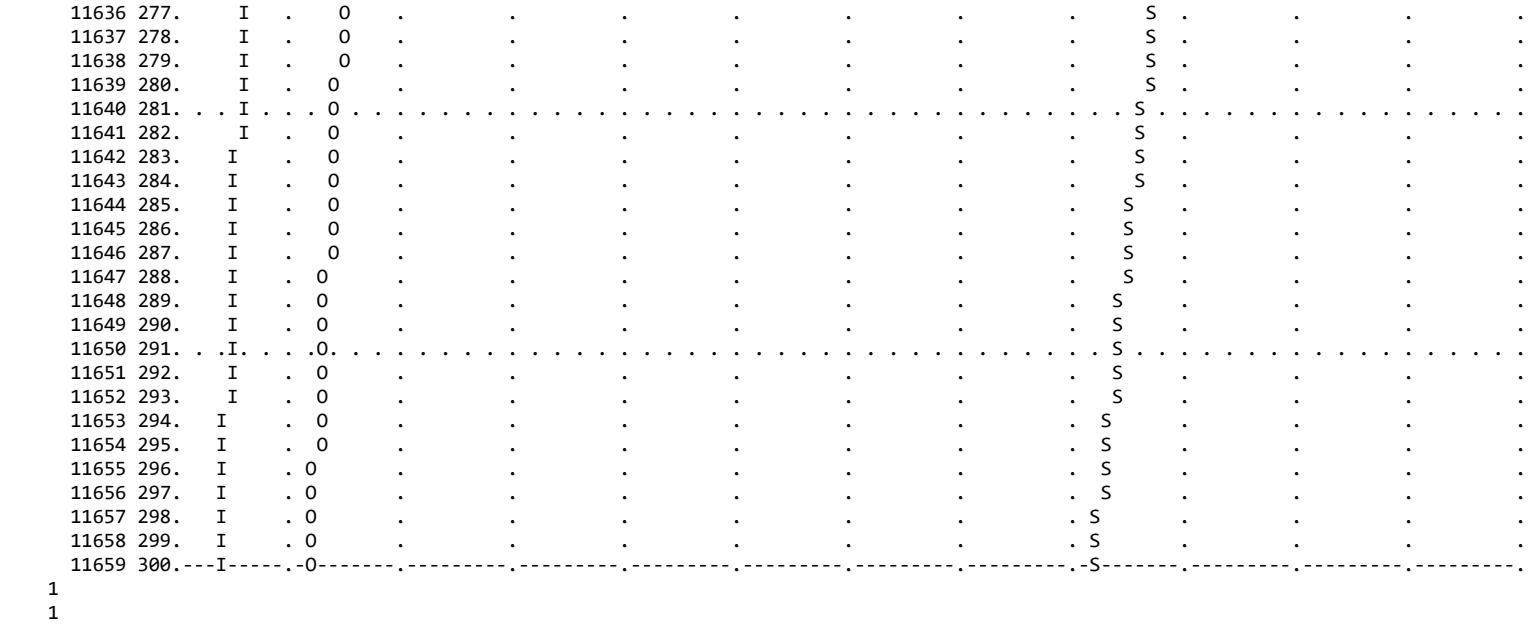
1                                                  STATION     DET1

                        (I) INFLOW,   (O) OUTFLOW
          0.        2.        4.        6.        8.       10.       12.       14.       16.        0.        0.        0.        0.
                                                                                                  (S) STORAGE
          .0        .0        .0        .0        .0        .0        .0        .1        .2        .3        .4        .0        .0
 DAHRMN PER
  11200   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
  11201   2I         .         .         .         .         .         S         .         .         .         .         .         .
  11202   3I         .         .         .         .         .         S         .         .         .         .         .         .
  11203   4OI        .         .         .         .         .         S         .         .         .         .         .         .
  11204   5OI        .         .         .         .         .         S         .         .         .         .         .         .
  11205   6OI        .         .         .         .         .         S         .         .         .         .         .         .
  11206   7OI        .         .         .         .         .         S         .         .         .         .         .         .
  11207   8OI        .         .         .         .         .         S         .         .         .         .         .         .
  11208   9O I       .         .         .         .         .         S         .         .         .         .         .         .
  11209  10O I       .         .         .         .         .         S         .         .         .         .         .         .
  11210  11O I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11211  12O I       .         .         .         .         .         S         .         .         .         .         .         .
  11212  13O I       .         .         .         .         .         S         .         .         .         .         .         .
  11213  14O I       .         .         .         .         .         S         .         .         .         .         .         .
  11214  15O I       .         .         .         .         .         S         .         .         .         .         .         .
  11215  16O I       .         .         .         .         .        .S         .         .         .         .         .         .
  11216  17O I       .         .         .         .         .        .S         .         .         .         .         .         .
  11217  18O I       .         .         .         .         .        .S         .         .         .         .         .         .
  11218  19O I       .         .         .         .         .        .S         .         .         .         .         .         .
  11219  20O I       .         .         .         .         .        .S         .         .         .         .         .         .
  11220  21O I . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11221  22O I       .         .         .         .         .        .S         .         .         .         .         .         .
  11222  23.OI       .         .         .         .         .        .S         .         .         .         .         .         .
  11223  24.OI       .         .         .         .         .        .S         .         .         .         .         .         .
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11224  25.OI      .       .       .       .       .       .S      .       .       .       .       .       .
11225  26.OI      .       .       .       .       .       .S      .       .       .       .       .       .
11226  27.OI      .       .       .       .       .       .S      .       .       .       .       .       .
11227  28.OI      .       .       .       .       .       .S      .       .       .       .       .       .
11228  29.OI      .       .       .       .       .       .S      .       .       .       .       .       .
11229  30.OI      .       .       .       .       .       .S      .       .       .       .       .       .
11230  31.OI . . . . . .S. . . . . .
11231  32.OI      .       .       .       .       .       .S      .       .       .       .       .       .
11232  33.OI      .       .       .       .       .       .S      .       .       .       .       .       .
11233  34.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11234  35.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11235  36.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11236  37.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11237  38.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11238  39.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11239  40.OI      .       .       .       .       .       . S     .       .       .       .       .       .
11240  41.O.I. . . . . S . . . . . .
11241  42.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11242  43.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11243  44.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11244  45.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11245  46.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11246  47.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11247  48.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11248  49.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11249  50.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11250  51.O.I. . . . . S . . . . . .
11251  52.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11252  53.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11253  54.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11254  55.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11255  56.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11256  57.O I     .       .       .       .       .       .  S    .       .       .       .       .       .
11257  58.O I     .       .       .       .       .       .  S    .       .       .       .       .       .
11258  59.O I     .       .       .       .       .       .  S    .       .       .       .       .       .
11259  60.O I     .       .       .       .       .       .  S    .       .       .       .       .       .
11300  61.O.I. . . . . .S. . . . . .
11301  62.O I     .       .       .       .       .       . S     .       .       .       .       .       .
11302  63. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11303  64. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11304  65. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11305  66. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11306  67. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11307  68. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11308  69. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11309  70. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11310  71. OI. . . . . .S. . . . . .
11311  72. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11312  73. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11313  74. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11314  75. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11315  76. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11316  77. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11317  78. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11318  79. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11319  80. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11320  81. OI. . . . . .S. . . . . .
11321  82. OI     .       .       .       .       .       . S     .       .       .       .       .       .
11322  83. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11323  84. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11324  85. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11325  86. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11326  87. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11327  88. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11328  89. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11329  90. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11330  91. OI. . . . . S . . . . . .
11331  92. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11332  93. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11333  94. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11334  95. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11335  96. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11336  97. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11337  98. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11338  99. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11339 100. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11340 101. OI. . . . . S . . . . . .
11341 102. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11342 103. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11343 104. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11344 105. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11345 106. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11346 107. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
11347 108. OI     .       .       .       .       .       .   S   .       .       .       .       .       .
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11348 109. OI     .       .       .       .       .       .   S     .       .       .       .       .       .
11349 110. OI     .       .       .       .       .       .   S     .       .       .       .       .       .
11350 111. OI. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
11351 112. OI     .       .       .       .       .       .    S    .       .       .       .       .       .
11352 113. OI     .       .       .       .       .       .    S    .       .       .       .       .       .
11353 114. OI     .       .       .       .       .       .    S    .       .       .       .       .       .
11354 115. OI     .       .       .       .       .       .    S    .       .       .       .       .       .
11355 116.  I     .       .       .       .       .       .    S    .       .       .       .       .       .
11356 117.  I     .       .       .       .       .       .    S    .       .       .       .       .       .
11357 118.  I     .       .       .       .       .       .    S    .       .       .       .       .       .
11358 119.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11359 120.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11400 121. .OI . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11401 122.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11402 123.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11403 124.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11404 125.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11405 126.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11406 127.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11407 128.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11408 129.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11409 130.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11410 131. .OI . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11411 132.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11412 133.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11413 134.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11414 135.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11415 136.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11416 137.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11417 138.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11418 139.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11419 140.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11420 141. .OI . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11421 142.  OI    .       .       .       .       .       .    S    .       .       .       .       .       .
11422 143.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11423 144.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11424 145.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11425 146.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11426 147.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11427 148.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11428 149.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11429 150.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11430 151. .OI . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
11431 152.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11432 153.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11433 154.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11434 155.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11435 156.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11436 157.  OI    .       .       .       .       .       .     S   .       .       .       .       .       .
11437 158.  O I   .       .       .       .       .       .     S   .       .       .       .       .       .
11438 159.  O I   .       .       .       .       .       .     S   .       .       .       .       .       .
11439 160.  O I   .       .       .       .       .       .     S   .       .       .       .       .       .
11440 161. .O.I. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
11441 162.  O I   .       .       .       .       .       .     S   .       .       .       .       .       .
11442 163.  O I   .       .       .       .       .       .     S   .       .       .       .       .       .
11443 164.  O I   .       .       .       .       .       .     S   .       .       .       .       .       .
11444 165.  O I   .       .       .       .       .       .     S   .       .       .       .       .       .
11445 166.  O I   .       .       .       .       .       .     S   .       .       .       .       .       .
11446 167.   OI   .       .       .       .       .       .     S   .       .       .       .       .       .
11447 168.   OI   .       .       .       .       .       .      S  .       .       .       .       .       .
11448 169.   OI   .       .       .       .       .       .      S  .       .       .       .       .       .
11449 170.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11450 171. . O I . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11451 172.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11452 173.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11453 174.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11454 175.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11455 176.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11456 177.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11457 178.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11458 179.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11459 180.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11500 181. . O I . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11501 182.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11502 183.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11503 184.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11504 185.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11505 186.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11506 187.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11507 188.   O I  .       .       .       .       .       .      S  .       .       .       .       .       .
11508 189.   O I  .       .       .       .       .       .       S .       .       .       .       .       .
11509 190.   O I  .       .       .       .       .       .       S .       .       .       .       .       .
11510 191. . O I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11511 192.   O  I  .       .       .       .       .       .       S .       .       .       .       .       .
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		SWVHD100	14.	4.12	2.	2.	2.	.01		
	ROUTED TO									
+		DET1	3.	4.30	1.	1.	1.	.01		
+									100.73	4.30

*** NORMAL END OF HEC-1 ***

```
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                    *          609 SECOND STREET           *
 *                                      *                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   06JUL20  TIME  16:42:56  *                    *           (916) 756-1104             *
 *                                      *                    *                                      *
 ****************************************                    ****************************************
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Detention Routing Calculation for Basin 200

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

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

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


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

 *** FREE ***
                         *DIAGRAM
              1          ID   SOUTH OTAY VTM; J-15013-C
              2          ID   PRELIMINARY DETENTION ANALYSIS FOR BASIN 2
              3          ID   FEBRUARY 28, 2019 - FILE NAME: SWV2HD00.hc1
              4          IT       1 01JAN90    1200     300
              5          IO       5       0
                         *

              6          KKSWVHD200.hc1
              7          KM   RUN DATE   7/6/2020
              8          KM   RATIONAL METHOD HYDROGRAPH PROGRAM
              9          KM   COPYRIGHT 1992, 2014, RICK ENGINEERING COMPANY
             10          KM   6HR RAINFALL IS 2 INCHES
             11          KM   RATIONAL METHOD RUNOFF COEFFICIENT IS 0.8
             12          KM   RATIONAL METHOD TIME OF CONCENTRATION IS 12 MIN.
             13          KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
             14          KM   IT 2 01JAN90 1200 200
             15          BA  0.0373
             16          IN      12 01JAN90    1154
             17          QI       0     2.3     2.3     2.5     2.5     2.7     2.7     2.9       3     3.2
             18          QI     3.3     3.6     3.8     4.2     4.5     5.1     5.5     6.8     7.7    11.3
             19          QI     8.5    64.8     9.1     6.1     4.8       4     3.5     3.1     2.8     2.6
             20          QI     2.4       0       0       0       0       0       0       0       0       0
             21          QI       0       0
                         *

             22          KK    DET1
             23          KO       2       2       0       0      21
             24          KM   BMP 1
             25          RS       1    STOR      -1
             26          SV       0   1.335   1.336   1.377
             27          SQ       0    16.3    28.0    31.5
             28          SE     100     101     102     103
                         *
             29          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6    SWVHD200
                  V
                  V
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*************************************                                  *************************************
 *                                   *                                  *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                              *    U.S. ARMY CORPS OF ENGINEERS     *
 *              JUN   1998             *                                *    HYDROLOGIC ENGINEERING CENTER    *
 *            VERSION 4.1              *                                *          609 SECOND STREET          *
 *                                   *                                  *       DAVIS, CALIFORNIA 95616       *
 *  RUN DATE   06JUL20  TIME  16:42:56   *                              *           (916) 756-1104            *
 *                                   *                                  *                                   *
 *************************************                                  *************************************
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SOUTH OTAY VTM; J-15013-C
PRELIMINARY DETENTION ANALYSIS FOR BASIN 2
FEBRUARY 28, 2019 - FILE NAME: SWV2HD00.hc1

```
  5 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           1  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN90  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1JAN90  ENDING DATE
                     NDTIME        1659  ENDING TIME
                     ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL     .02 HOURS
                     TOTAL TIME BASE    4.98 HOURS

        ENGLISH UNITS
             DRAINAGE AREA         SQUARE MILES
             PRECIPITATION DEPTH   INCHES
             LENGTH, ELEVATION     FEET
             FLOW                  CUBIC FEET PER SECOND
             STORAGE VOLUME        ACRE-FEET
             SURFACE AREA          ACRES
             TEMPERATURE           DEGREES FAHRENHEIT


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


          **************
          *            *
 22 KK    *      DET1  *
          *            *
          **************

 23 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           2  PRINT CONTROL
                      IPLOT           2  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         300  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .017  TIME INTERVAL IN HOURS

                         BMP 1

            HYDROGRAPH ROUTING DATA

 25 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        STOR  TYPE OF INITIAL CONDITION
                     RSVRIC       -1.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 26 SV            STORAGE          .0       1.3       1.3       1.4

 27 SQ          DISCHARGE          0.       16.       28.       32.

 28 SE          ELEVATION      100.00    101.00    102.00    103.00
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***

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 16. TO 28.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION DET1

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JAN	1200	1	1.	.1	100.1	1	JAN	1340	101	2.	.2	100.2	1	JAN	1520	201	4.	.4	100.3
1	JAN	1201	2	1.	.1	100.1	1	JAN	1341	102	2.	.2	100.2	1	JAN	1521	202	4.	.4	100.3
1	JAN	1202	3	1.	.1	100.1	1	JAN	1342	103	2.	.2	100.2	1	JAN	1522	203	5.	.4	100.3
1	JAN	1203	4	1.	.1	100.1	1	JAN	1343	104	2.	.2	100.2	1	JAN	1523	204	5.	.4	100.3
1	JAN	1204	5	1.	.1	100.1	1	JAN	1344	105	2.	.2	100.2	1	JAN	1524	205	5.	.4	100.3
1	JAN	1205	6	1.	.1	100.1	1	JAN	1345	106	3.	.2	100.2	1	JAN	1525	206	5.	.4	100.3
1	JAN	1206	7	1.	.1	100.1	1	JAN	1346	107	3.	.2	100.2	1	JAN	1526	207	5.	.4	100.3
1	JAN	1207	8	1.	.1	100.1	1	JAN	1347	108	3.	.2	100.2	1	JAN	1527	208	5.	.4	100.3
1	JAN	1208	9	1.	.1	100.1	1	JAN	1348	109	3.	.2	100.2	1	JAN	1528	209	5.	.4	100.3
1	JAN	1209	10	1.	.1	100.1	1	JAN	1349	110	3.	.2	100.2	1	JAN	1529	210	5.	.4	100.3
1	JAN	1210	11	1.	.1	100.1	1	JAN	1350	111	3.	.2	100.2	1	JAN	1530	211	5.	.4	100.3
1	JAN	1211	12	1.	.1	100.1	1	JAN	1351	112	3.	.2	100.2	1	JAN	1531	212	5.	.4	100.3
1	JAN	1212	13	1.	.1	100.1	1	JAN	1352	113	3.	.2	100.2	1	JAN	1532	213	5.	.4	100.3
1	JAN	1213	14	1.	.1	100.1	1	JAN	1353	114	3.	.2	100.2	1	JAN	1533	214	5.	.4	100.3
1	JAN	1214	15	1.	.1	100.1	1	JAN	1354	115	3.	.2	100.2	1	JAN	1534	215	5.	.4	100.3
1	JAN	1215	16	1.	.1	100.1	1	JAN	1355	116	3.	.2	100.2	1	JAN	1535	216	5.	.4	100.3
1	JAN	1216	17	1.	.1	100.1	1	JAN	1356	117	3.	.2	100.2	1	JAN	1536	217	5.	.4	100.3
1	JAN	1217	18	1.	.1	100.1	1	JAN	1357	118	3.	.2	100.2	1	JAN	1537	218	5.	.4	100.3
1	JAN	1218	19	1.	.1	100.1	1	JAN	1358	119	3.	.2	100.2	1	JAN	1538	219	5.	.4	100.3
1	JAN	1219	20	1.	.1	100.1	1	JAN	1359	120	3.	.2	100.2	1	JAN	1539	220	5.	.4	100.3
1	JAN	1220	21	1.	.1	100.1	1	JAN	1400	121	3.	.2	100.2	1	JAN	1540	221	6.	.5	100.3
1	JAN	1221	22	1.	.1	100.1	1	JAN	1401	122	3.	.2	100.2	1	JAN	1541	222	6.	.5	100.3
1	JAN	1222	23	1.	.1	100.1	1	JAN	1402	123	3.	.2	100.2	1	JAN	1542	223	6.	.5	100.4
1	JAN	1223	24	1.	.1	100.1	1	JAN	1403	124	3.	.2	100.2	1	JAN	1543	224	6.	.5	100.4
1	JAN	1224	25	1.	.1	100.1	1	JAN	1404	125	3.	.2	100.2	1	JAN	1544	225	6.	.5	100.4
1	JAN	1225	26	2.	.1	100.1	1	JAN	1405	126	3.	.2	100.2	1	JAN	1545	226	6.	.5	100.4
1	JAN	1226	27	2.	.1	100.1	1	JAN	1406	127	3.	.2	100.2	1	JAN	1546	227	6.	.5	100.4
1	JAN	1227	28	2.	.1	100.1	1	JAN	1407	128	3.	.2	100.2	1	JAN	1547	228	6.	.5	100.4
1	JAN	1228	29	2.	.1	100.1	1	JAN	1408	129	3.	.2	100.2	1	JAN	1548	229	6.	.5	100.4
1	JAN	1229	30	2.	.1	100.1	1	JAN	1409	130	3.	.2	100.2	1	JAN	1549	230	6.	.5	100.4
1	JAN	1230	31	2.	.1	100.1	1	JAN	1410	131	3.	.2	100.2	1	JAN	1550	231	6.	.5	100.4
1	JAN	1231	32	2.	.1	100.1	1	JAN	1411	132	3.	.2	100.2	1	JAN	1551	232	6.	.5	100.4
1	JAN	1232	33	2.	.1	100.1	1	JAN	1412	133	3.	.2	100.2	1	JAN	1552	233	6.	.5	100.4
1	JAN	1233	34	2.	.1	100.1	1	JAN	1413	134	3.	.2	100.2	1	JAN	1553	234	6.	.5	100.4
1	JAN	1234	35	2.	.1	100.1	1	JAN	1414	135	3.	.2	100.2	1	JAN	1554	235	6.	.5	100.4
1	JAN	1235	36	2.	.1	100.1	1	JAN	1415	136	3.	.2	100.2	1	JAN	1555	236	7.	.5	100.4
1	JAN	1236	37	2.	.1	100.1	1	JAN	1416	137	3.	.2	100.2	1	JAN	1556	237	7.	.5	100.4
1	JAN	1237	38	2.	.1	100.1	1	JAN	1417	138	3.	.2	100.2	1	JAN	1557	238	7.	.6	100.4
1	JAN	1238	39	2.	.1	100.1	1	JAN	1418	139	3.	.2	100.2	1	JAN	1558	239	7.	.6	100.4
1	JAN	1239	40	2.	.1	100.1	1	JAN	1419	140	3.	.2	100.2	1	JAN	1559	240	8.	.6	100.5
1	JAN	1240	41	2.	.1	100.1	1	JAN	1420	141	3.	.2	100.2	1	JAN	1600	241	8.	.7	100.5
1	JAN	1241	42	2.	.1	100.1	1	JAN	1421	142	3.	.2	100.2	1	JAN	1601	242	9.	.7	100.5
1	JAN	1242	43	2.	.1	100.1	1	JAN	1422	143	3.	.2	100.2	1	JAN	1602	243	9.	.7	100.6
1	JAN	1243	44	2.	.1	100.1	1	JAN	1423	144	3.	.2	100.2	1	JAN	1603	244	10.	.8	100.6
1	JAN	1244	45	2.	.1	100.1	1	JAN	1424	145	3.	.2	100.2	1	JAN	1604	245	11.	.9	100.6
1	JAN	1245	46	2.	.1	100.1	1	JAN	1425	146	3.	.2	100.2	1	JAN	1605	246	11.	.9	100.7
1	JAN	1246	47	2.	.1	100.1	1	JAN	1426	147	3.	.3	100.2	1	JAN	1606	247	12.	1.0	100.7
1	JAN	1247	48	2.	.1	100.1	1	JAN	1427	148	3.	.3	100.2	1	JAN	1607	248	13.	1.1	100.8
1	JAN	1248	49	2.	.1	100.1	1	JAN	1428	149	3.	.3	100.2	1	JAN	1608	249	14.	1.1	100.8
1	JAN	1249	50	2.	.2	100.1	1	JAN	1429	150	3.	.3	100.2	1	JAN	1609	250	14.	1.2	100.9
1	JAN	1250	51	2.	.2	100.1	1	JAN	1430	151	3.	.3	100.2	1	JAN	1610	251	15.	1.2	100.9
1	JAN	1251	52	2.	.2	100.1	1	JAN	1431	152	3.	.3	100.2	1	JAN	1611	252	15.	1.3	100.9
1	JAN	1252	53	2.	.2	100.1	1	JAN	1432	153	3.	.3	100.2	1	JAN	1612	253	16.	1.3	101.0
1	JAN	1253	54	2.	.2	100.1	1	JAN	1433	154	3.	.3	100.2	1	JAN	1613	254	16.	1.3	101.0
1	JAN	1254	55	2.	.2	100.1	1	JAN	1434	155	3.	.3	100.2	1	JAN	1614	255	28.	1.3	102.0
1	JAN	1255	56	2.	.2	100.1	1	JAN	1435	156	3.	.3	100.2	1	JAN	1615	256	24.	1.3	101.6
1	JAN	1256	57	2.	.2	100.1	1	JAN	1436	157	3.	.3	100.2	1	JAN	1616	257	18.	1.3	101.2
1	JAN	1257	58	2.	.2	100.1	1	JAN	1437	158	3.	.3	100.2	1	JAN	1617	258	16.	1.3	101.0
1	JAN	1258	59	2.	.2	100.1	1	JAN	1438	159	3.	.3	100.2	1	JAN	1618	259	16.	1.3	101.0
1	JAN	1259	60	2.	.2	100.1	1	JAN	1439	160	3.	.3	100.2	1	JAN	1619	260	16.	1.3	101.0
1	JAN	1300	61	2.	.2	100.1	1	JAN	1440	161	3.	.3	100.2	1	JAN	1620	261	16.	1.3	101.0
1	JAN	1301	62	2.	.2	100.1	1	JAN	1441	162	3.	.3	100.2	1	JAN	1621	262	16.	1.3	101.0
1	JAN	1302	63	2.	.2	100.1	1	JAN	1442	163	3.	.3	100.2	1	JAN	1622	263	16.	1.3	101.0
1	JAN	1303	64	2.	.2	100.1	1	JAN	1443	164	3.	.3	100.2	1	JAN	1623	264	16.	1.3	101.0
1	JAN	1304	65	2.	.2	100.1	1	JAN	1444	165	3.	.3	100.2	1	JAN	1624	265	15.	1.3	100.9
1	JAN	1305	66	2.	.2	100.1	1	JAN	1445	166	3.	.3	100.2	1	JAN	1625	266	15.	1.3	100.9
1	JAN	1306	67	2.	.2	100.1	1	JAN	1446	167	3.	.3	100.2	1	JAN	1626	267	15.	1.2	100.9
1	JAN	1307	68	2.	.2	100.1	1	JAN	1447	168	3.	.3	100.2	1	JAN	1627	268	15.	1.2	100.9
1	JAN	1308	69	2.	.2	100.1	1	JAN	1448	169	3.	.3	100.2	1	JAN	1628	269	15.	1.2	100.9
1	JAN	1309	70	2.	.2	100.1	1	JAN	1449	170	4.	.3	100.2	1	JAN	1629	270	15.	1.2	100.9

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   1 JAN 1310  71       2.       .2   100.1 *  1 JAN 1450 171       4.       .3   100.2 *  1 JAN 1630 271      15.      1.2   100.9
   1 JAN 1311  72       2.       .2   100.1 *  1 JAN 1451 172       4.       .3   100.2 *  1 JAN 1631 272      14.      1.2   100.9
   1 JAN 1312  73       2.       .2   100.1 *  1 JAN 1452 173       4.       .3   100.2 *  1 JAN 1632 273      14.      1.2   100.9
   1 JAN 1313  74       2.       .2   100.1 *  1 JAN 1453 174       4.       .3   100.2 *  1 JAN 1633 274      14.      1.2   100.9
   1 JAN 1314  75       2.       .2   100.1 *  1 JAN 1454 175       4.       .3   100.2 *  1 JAN 1634 275      14.      1.2   100.9
   1 JAN 1315  76       2.       .2   100.1 *  1 JAN 1455 176       4.       .3   100.2 *  1 JAN 1635 276      14.      1.1   100.9
   1 JAN 1316  77       2.       .2   100.1 *  1 JAN 1456 177       4.       .3   100.2 *  1 JAN 1636 277      14.      1.1   100.8
   1 JAN 1317  78       2.       .2   100.1 *  1 JAN 1457 178       4.       .3   100.2 *  1 JAN 1637 278      14.      1.1   100.8
   1 JAN 1318  79       2.       .2   100.1 *  1 JAN 1458 179       4.       .3   100.2 *  1 JAN 1638 279      13.      1.1   100.8
   1 JAN 1319  80       2.       .2   100.1 *  1 JAN 1459 180       4.       .3   100.2 *  1 JAN 1639 280      13.      1.1   100.8
   1 JAN 1320  81       2.       .2   100.1 *  1 JAN 1500 181       4.       .3   100.2 *  1 JAN 1640 281      13.      1.1   100.8
   1 JAN 1321  82       2.       .2   100.1 *  1 JAN 1501 182       4.       .3   100.2 *  1 JAN 1641 282      13.      1.1   100.8
   1 JAN 1322  83       2.       .2   100.1 *  1 JAN 1502 183       4.       .3   100.2 *  1 JAN 1642 283      13.      1.1   100.8
   1 JAN 1323  84       2.       .2   100.1 *  1 JAN 1503 184       4.       .3   100.2 *  1 JAN 1643 284      13.      1.0   100.8
   1 JAN 1324  85       2.       .2   100.1 *  1 JAN 1504 185       4.       .3   100.2 *  1 JAN 1644 285      13.      1.0   100.8
   1 JAN 1325  86       2.       .2   100.1 *  1 JAN 1505 186       4.       .3   100.2 *  1 JAN 1645 286      13.      1.0   100.8
   1 JAN 1326  87       2.       .2   100.1 *  1 JAN 1506 187       4.       .3   100.2 *  1 JAN 1646 287      12.      1.0   100.8
   1 JAN 1327  88       2.       .2   100.1 *  1 JAN 1507 188       4.       .3   100.2 *  1 JAN 1647 288      12.      1.0   100.8
   1 JAN 1328  89       2.       .2   100.1 *  1 JAN 1508 189       4.       .3   100.2 *  1 JAN 1648 289      12.      1.0   100.7
   1 JAN 1329  90       2.       .2   100.1 *  1 JAN 1509 190       4.       .3   100.2 *  1 JAN 1649 290      12.      1.0   100.7
   1 JAN 1330  91       2.       .2   100.1 *  1 JAN 1510 191       4.       .3   100.2 *  1 JAN 1650 291      12.      1.0   100.7
   1 JAN 1331  92       2.       .2   100.1 *  1 JAN 1511 192       4.       .3   100.3 *  1 JAN 1651 292      12.      1.0   100.7
   1 JAN 1332  93       2.       .2   100.1 *  1 JAN 1512 193       4.       .3   100.3 *  1 JAN 1652 293      12.      1.0   100.7
   1 JAN 1333  94       2.       .2   100.1 *  1 JAN 1513 194       4.       .3   100.3 *  1 JAN 1653 294      12.       .9   100.7
   1 JAN 1334  95       2.       .2   100.1 *  1 JAN 1514 195       4.       .3   100.3 *  1 JAN 1654 295      11.       .9   100.7
   1 JAN 1335  96       2.       .2   100.1 *  1 JAN 1515 196       4.       .3   100.3 *  1 JAN 1655 296      11.       .9   100.7
   1 JAN 1336  97       2.       .2   100.1 *  1 JAN 1516 197       4.       .3   100.3 *  1 JAN 1656 297      11.       .9   100.7
   1 JAN 1337  98       2.       .2   100.1 *  1 JAN 1517 198       4.       .4   100.3 *  1 JAN 1657 298      11.       .9   100.7
   1 JAN 1338  99       2.       .2   100.1 *  1 JAN 1518 199       4.       .4   100.3 *  1 JAN 1658 299      11.       .9   100.7
   1 JAN 1339 100       2.       .2   100.1 *  1 JAN 1519 200       4.       .4   100.3 *  1 JAN 1659 300      11.       .9   100.7
                                              *                                             *
 ********************************************************************************************************************************************

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR      4.98-HR
+   (CFS)       (HR)
                        (CFS)
+      28.      4.23                 5.          5.          5.          5.
                           (INCHES)     1.071       1.071       1.071       1.071
                            (AC-FT)        2.          2.          2.          2.

 PEAK STORAGE   TIME                      MAXIMUM AVERAGE STORAGE
                                  6-HR       24-HR       72-HR      4.98-HR
+  (AC-FT)      (HR)
        1.      4.23                 0.          0.          0.          0.

  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                  6-HR       24-HR       72-HR      4.98-HR
+   (FEET)      (HR)
    101.96      4.23               100.32      100.32      100.32      100.32

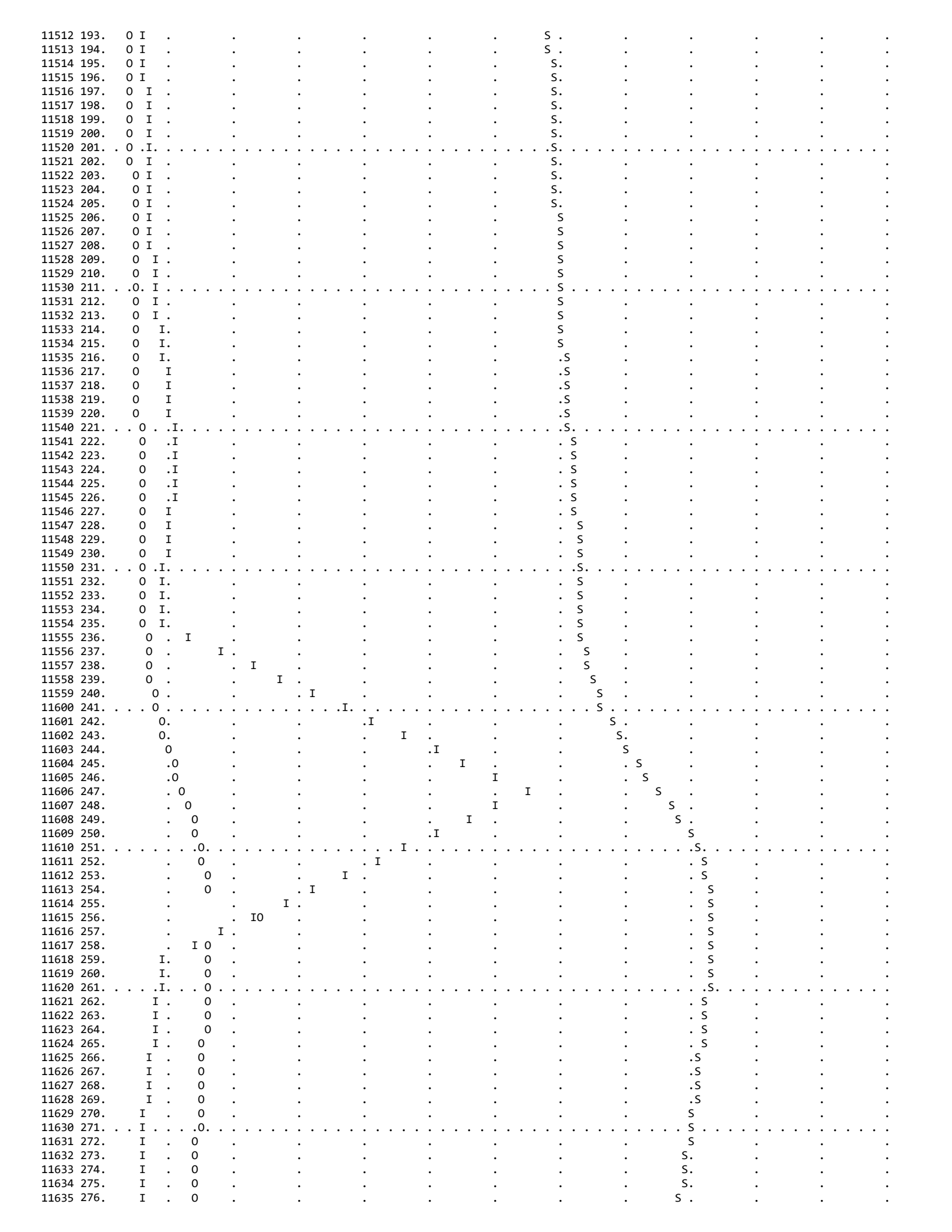
                         CUMULATIVE AREA =     .04 SQ MI

1                                                  STATION     DET1

                       (I) INFLOW,   (O) OUTFLOW
         0.       10.       20.       30.       40.       50.       60.       70.       0.        0.        0.        0.        0.
                                                                                          (S) STORAGE
         .0        .0        .0        .0        .0        .0        .0        .4        .8       1.2       1.6        .0        .0
 DAHRMN PER
  11200   1.I---------.---------.---------.---------.---------.---------.-S-------.---------.---------.---------.---------.---------.
  11201   2.I         .         .         .         .         .         . S       .         .         .         .         .         .
  11202   3.OI        .         .         .         .         .         . S       .         .         .         .         .         .
  11203   4.OI        .         .         .         .         .         . S       .         .         .         .         .         .
  11204   5.OI        .         .         .         .         .         . S       .         .         .         .         .         .
  11205   6.OI        .         .         .         .         .         . S       .         .         .         .         .         .
  11206   7.OI        .         .         .         .         .         . S       .         .         .         .         .         .
  11207   8.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11208   9.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11209  10.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11210  11.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11211  12.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11212  13.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11213  14.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11214  15.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11215  16.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11216  17.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11217  18.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11218  19.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11219  20.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11220  21.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11221  22.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11222  23.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
  11223  24.OI        .         .         .         .         .         .  S      .         .         .         .         .         .
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11224  25.OI      .       .       .       .       .       .  S     .       .       .       .       .       .
11225  26. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11226  27. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11227  28. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11228  29. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11229  30. I      .       .       .       .       .       .  S     .       .       .       .       .       .
11230  31. OI. . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11231  32. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11232  33. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11233  34. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11234  35. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11235  36. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11236  37. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11237  38. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11238  39. OI     .       .       .       .       .       .  S     .       .       .       .       .       .
11239  40. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11240  41. OI. . . . . . . . . . . . . . . . . . . . . . . . S. . . . . . . . . . . . . . . . . . . . . . . . .
11241  42. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11242  43. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11243  44. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11244  45. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11245  46. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11246  47. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11247  48. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11248  49. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11249  50. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11250  51. OI. . . . . . . . . . . . . . . . . . . . . . . . S. . . . . . . . . . . . . . . . . . . . . . . . .
11251  52. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11252  53. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11253  54. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11254  55. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11255  56. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11256  57. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11257  58. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11258  59. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11259  60. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11300  61. OI. . . . . . . . . . . . . . . . . . . . . . . . S. . . . . . . . . . . . . . . . . . . . . . . . .
11301  62. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11302  63. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11303  64. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11304  65. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11305  66. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11306  67. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11307  68. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11308  69. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11309  70. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11310  71. OI. . . . . . . . . . . . . . . . . . . . . . . . S. . . . . . . . . . . . . . . . . . . . . . . . .
11311  72. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11312  73. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11313  74. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11314  75. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11315  76. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11316  77. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11317  78. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11318  79. OI     .       .       .       .       .       .   S    .       .       .       .       .       .
11319  80. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11320  81. OI. . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11321  82. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11322  83. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11323  84. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11324  85. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11325  86. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11326  87. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11327  88. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11328  89. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11329  90. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11330  91. OI. . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11331  92. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11332  93. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11333  94. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11334  95. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11335  96. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11336  97. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11337  98. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11338  99. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11339 100. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11340 101. OI. . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11341 102. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11342 103. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11343 104. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11344 105. OI     .       .       .       .       .       .    S   .       .       .       .       .       .
11345 106.  I     .       .       .       .       .       .    S   .       .       .       .       .       .
11346 107.  I     .       .       .       .       .       .    S   .       .       .       .       .       .
11347 108.  I     .       .       .       .       .       .    S   .       .       .       .       .       .
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11348 109.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11349 110.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11350 111. .I. . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11351 112.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11352 113.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11353 114.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11354 115.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11355 116.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11356 117.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11357 118.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11358 119.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11359 120.  I     .       .       .       .       .       .   S   .       .       .       .       .       .
11400 121. .I. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11401 122.  I     .       .       .       .       .       .    S  .       .       .       .       .       .
11402 123.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11403 124.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11404 125.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11405 126.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11406 127.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11407 128.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11408 129.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11409 130.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11410 131. .OI . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11411 132.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11412 133.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11413 134.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11414 135.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11415 136.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11416 137.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11417 138.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11418 139.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11419 140.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11420 141. .OI . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11421 142.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11422 143.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11423 144.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11424 145.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11425 146.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11426 147.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11427 148.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11428 149.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11429 150.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11430 151. .OI . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11431 152.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11432 153.  OI    .       .       .       .       .       .    S  .       .       .       .       .       .
11433 154.  OI    .       .       .       .       .       .     S .       .       .       .       .       .
11434 155.  OI    .       .       .       .       .       .     S .       .       .       .       .       .
11435 156.  OI    .       .       .       .       .       .     S .       .       .       .       .       .
11436 157.  OI    .       .       .       .       .       .     S .       .       .       .       .       .
11437 158.  OI    .       .       .       .       .       .     S .       .       .       .       .       .
11438 159.  OI    .       .       .       .       .       .     S .       .       .       .       .       .
11439 160.  OI    .       .       .       .       .       .     S .       .       .       .       .       .
11440 161. .OI . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11441 162.  OI    .       .       .       .       .       .     S .       .       .       .       .       .
11442 163.  O I   .       .       .       .       .       .     S .       .       .       .       .       .
11443 164.  O I   .       .       .       .       .       .     S .       .       .       .       .       .
11444 165.  O I   .       .       .       .       .       .     S .       .       .       .       .       .
11445 166.  O I   .       .       .       .       .       .     S .       .       .       .       .       .
11446 167.  O I   .       .       .       .       .       .     S .       .       .       .       .       .
11447 168.  O I   .       .       .       .       .       .     S .       .       .       .       .       .
11448 169.  O I   .       .       .       .       .       .     S .       .       .       .       .       .
11449 170.   OI   .       .       .       .       .       .     S .       .       .       .       .       .
11450 171. . OI. . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11451 172.   OI   .       .       .       .       .       .     S .       .       .       .       .       .
11452 173.   OI   .       .       .       .       .       .     S .       .       .       .       .       .
11453 174.   OI   .       .       .       .       .       .     S .       .       .       .       .       .
11454 175.   OI   .       .       .       .       .       .     S .       .       .       .       .       .
11455 176.   OI   .       .       .       .       .       .     S .       .       .       .       .       .
11456 177.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11457 178.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11458 179.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11459 180.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11500 181. . OI. . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11501 182.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11502 183.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11503 184.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11504 185.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11505 186.   OI   .       .       .       .       .       .      S.       .       .       .       .       .
11506 187.   O I  .       .       .       .       .       .      S.       .       .       .       .       .
11507 188.   O I  .       .       .       .       .       .      S.       .       .       .       .       .
11508 189.   O I  .       .       .       .       .       .      S.       .       .       .       .       .
11509 190.   O I  .       .       .       .       .       .      S.       .       .       .       .       .
11510 191. . O I . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11511 192.   O I  .       .       .       .       .       .      S.       .       .       .       .       .
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1
1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		SWVHD200	65.	4.10	7.	7.	7.	.04		
	ROUTED TO									
+		DET1	28.	4.23	5.	5.	5.	.04		
+									101.96	4.23

*** NORMAL END OF HEC-1 ***

```
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                    *          609 SECOND STREET           *
 *                                      *                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   17FEB22  TIME  14:36:17  *                    *           (916) 756-1104             *
 *                                      *                    *                                      *
 ****************************************                    ****************************************
```

Detention Routing Calculation for Basin 300

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

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

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


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

 *** FREE ***
                    *DIAGRAM
              1     ID   SOUTH OTAY VTM; J-15013-C
              2     ID   DETENTION ANALYSIS FOR BASIN 3
              3     ID   FEBURARY 16, 2022 - FILE NAME: SWV3HD00.hc1
              4     IT       1 01JAN90    1200     300
              5     IO       5       0
                    *

              6     KKSWV385_100YR.hc1
              7     KM   RUN DATE   2/16/2022
              8     KM   RATIONAL METHOD HYDROGRAPH PROGRAM
              9     KM   COPYRIGHT 1992, 2014, RICK ENGINEERING COMPANY
             10     KM   6HR RAINFALL IS 2 INCHES
             11     KM   RATIONAL METHOD RUNOFF COEFFICIENT IS 0.8
             12     KM   RATIONAL METHOD TIME OF CONCENTRATION IS 10 MIN.
             13     KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
             14     KM   IT 2 01JAN90 1200 200
             15     BA  0.0113
             16     IN      10 01JAN90    1155
             17     QI       0     0.7     0.7     0.7     0.7     0.8     0.8     0.8     0.9     0.9
             18     QI     0.9       1       1     1.1     1.1     1.2     1.3     1.4     1.5     1.7
             19     QI     1.9     2.3     2.6     3.8       5    19.8     3.1     2.1     1.6     1.4
             20     QI     1.2       1       1     0.9     0.8     0.8     0.7       0       0       0
             21     QI       0       0       0       0       0       0       0       0
                    *

             22     KKSWV367_100YR.hc1
             23     KM   RUN DATE   2/16/2022
             24     KM   RATIONAL METHOD HYDROGRAPH PROGRAM
             25     KM   COPYRIGHT 1992, 2014, RICK ENGINEERING COMPANY
             26     KM   6HR RAINFALL IS 2 INCHES
             27     KM   RATIONAL METHOD RUNOFF COEFFICIENT IS 0.8
             28     KM   RATIONAL METHOD TIME OF CONCENTRATION IS 12 MIN.
             29     KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
             30     KM   IT 2 01JAN90 1200 200
             31     BA  0.0464
             32     IN      12 01JAN90    1154
             33     QI       0     2.8     2.9     3.1     3.1     3.3     3.4     3.6     3.7       4
             34     QI     4.1     4.5     4.7     5.2     5.5     6.4     6.9     8.4     9.6    14.1
             35     QI    11.6    79.4    11.3     7.6     5.9       5     4.3     3.8     3.5     3.2
             36     QI       3       0       0       0       0       0       0       0       0       0
             37     QI       0       0
                    *

             38     KK   VAULT300 COMBINED
```

```
            39          KO       2       2       0       0       0
            40          KM   COMBINE INFLOW HYDROGRAPHS TO VAULT 300
            41          HC       2
                        *
1                                                HEC-1 INPUT                                                    PAGE  2

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


            42          KK   VAULT300
            43          KO       2       2       0       0      21
            44          KM   VAULT 300
            45          RS       1    ELEV       5
            46          SV       0   0.202   0.526    0.85   1.173   1.497   1.659   1.821   1.983   2.144
            47          SV   2.306   2.468    2.63   2.792   2.954   3.116   3.277   3.439   3.601   3.763
            48          SQ   0.478   0.701   0.869   1.009   1.132   1.243    2.09   3.594   5.526   7.803
            49          SQ   8.621   9.346  12.136  16.639   22.25  25.404  33.906  47.504  64.397  83.955
            50          SE       0       1       2       3       4       5     5.5       6     6.5       7
            51          SE     7.5       8     8.5       9     9.5      10    10.5      11    11.5      12
                        *
            52          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6    SWV385_1
                .
                .
    22          .    SWV367_1
                .           .
                .           .
    38       VAULT............
                V
                V
    42       VAULT

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                                    ****************************************
 *                                      *                                   *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                   *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                                   *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                   *          609 SECOND STREET           *
 *                                      *                                   *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   17FEB22  TIME  14:36:17  *                                   *           (916) 756-1104             *
 *                                      *                                   *                                      *
 ****************************************                                    ****************************************




                        SOUTH OTAY VTM; J-15013-C
                        DETENTION ANALYSIS FOR BASIN 3
                        FEBURARY 16, 2022 - FILE NAME: SWV3HD00.hc1

    5 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           5  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                        NMIN           1  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1JAN90  STARTING DATE
                       ITIME        1200  STARTING TIME
                          NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1JAN90  ENDING DATE
                      NDTIME        1659  ENDING TIME
                      ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL     .02 HOURS
                        TOTAL TIME BASE    4.98 HOURS

           ENGLISH UNITS
                DRAINAGE AREA         SQUARE MILES
                PRECIPITATION DEPTH   INCHES
                LENGTH, ELEVATION     FEET
                FLOW                  CUBIC FEET PER SECOND
                STORAGE VOLUME        ACRE-FEET
                SURFACE AREA          ACRES
                TEMPERATURE           DEGREES FAHRENHEIT
```

*** ***

```
          **************
          *            *
 38 KK    *     VAULT  *     300 COMBINED
          *            *
          **************

 39 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           2  PRINT CONTROL
                     IPLOT           2  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                         COMBINE INFLOW HYDROGRAPHS TO VAULT 300

 41 HC          HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***
```

****

HYDROGRAPH AT STATION VAULT
SUM OF 2 HYDROGRAPHS

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1	JAN	1200	1	2.	1	JAN	1315	76	4.	1	JAN	1430	151	6.	1	JAN	1545	226	17.
1	JAN	1201	2	2.	1	JAN	1316	77	4.	1	JAN	1431	152	6.	1	JAN	1546	227	17.
1	JAN	1202	3	2.	1	JAN	1317	78	4.	1	JAN	1432	153	7.	1	JAN	1547	228	17.
1	JAN	1203	4	3.	1	JAN	1318	79	5.	1	JAN	1433	154	7.	1	JAN	1548	229	17.
1	JAN	1204	5	3.	1	JAN	1319	80	5.	1	JAN	1434	155	7.	1	JAN	1549	230	17.
1	JAN	1205	6	3.	1	JAN	1320	81	5.	1	JAN	1435	156	7.	1	JAN	1550	231	17.
1	JAN	1206	7	4.	1	JAN	1321	82	5.	1	JAN	1436	157	7.	1	JAN	1551	232	17.
1	JAN	1207	8	4.	1	JAN	1322	83	5.	1	JAN	1437	158	7.	1	JAN	1552	233	17.
1	JAN	1208	9	4.	1	JAN	1323	84	5.	1	JAN	1438	159	7.	1	JAN	1553	234	17.
1	JAN	1209	10	4.	1	JAN	1324	85	5.	1	JAN	1439	160	7.	1	JAN	1554	235	16.
1	JAN	1210	11	4.	1	JAN	1325	86	5.	1	JAN	1440	161	7.	1	JAN	1555	236	22.
1	JAN	1211	12	4.	1	JAN	1326	87	5.	1	JAN	1441	162	7.	1	JAN	1556	237	29.
1	JAN	1212	13	4.	1	JAN	1327	88	5.	1	JAN	1442	163	7.	1	JAN	1557	238	37.
1	JAN	1213	14	4.	1	JAN	1328	89	5.	1	JAN	1443	164	7.	1	JAN	1558	239	44.
1	JAN	1214	15	4.	1	JAN	1329	90	5.	1	JAN	1444	165	7.	1	JAN	1559	240	51.
1	JAN	1215	16	4.	1	JAN	1330	91	5.	1	JAN	1445	166	7.	1	JAN	1600	241	58.
1	JAN	1216	17	4.	1	JAN	1331	92	5.	1	JAN	1446	167	7.	1	JAN	1601	242	65.
1	JAN	1217	18	4.	1	JAN	1332	93	5.	1	JAN	1447	168	7.	1	JAN	1602	243	72.
1	JAN	1218	19	4.	1	JAN	1333	94	5.	1	JAN	1448	169	7.	1	JAN	1603	244	79.
1	JAN	1219	20	4.	1	JAN	1334	95	5.	1	JAN	1449	170	7.	1	JAN	1604	245	86.
1	JAN	1220	21	4.	1	JAN	1335	96	5.	1	JAN	1450	171	8.	1	JAN	1605	246	94.
1	JAN	1221	22	4.	1	JAN	1336	97	5.	1	JAN	1451	172	8.	1	JAN	1606	247	98.
1	JAN	1222	23	4.	1	JAN	1337	98	5.	1	JAN	1452	173	8.	1	JAN	1607	248	90.
1	JAN	1223	24	4.	1	JAN	1338	99	5.	1	JAN	1453	174	8.	1	JAN	1608	249	83.
1	JAN	1224	25	4.	1	JAN	1339	100	5.	1	JAN	1454	175	8.	1	JAN	1609	250	75.
1	JAN	1225	26	4.	1	JAN	1340	101	5.	1	JAN	1455	176	8.	1	JAN	1610	251	68.
1	JAN	1226	27	4.	1	JAN	1341	102	5.	1	JAN	1456	177	8.	1	JAN	1611	252	61.
1	JAN	1227	28	4.	1	JAN	1342	103	5.	1	JAN	1457	178	8.	1	JAN	1612	253	53.
1	JAN	1228	29	4.	1	JAN	1343	104	5.	1	JAN	1458	179	8.	1	JAN	1613	254	46.
1	JAN	1229	30	4.	1	JAN	1344	105	5.	1	JAN	1459	180	8.	1	JAN	1614	255	39.
1	JAN	1230	31	4.	1	JAN	1345	106	5.	1	JAN	1500	181	8.	1	JAN	1615	256	31.
1	JAN	1231	32	4.	1	JAN	1346	107	5.	1	JAN	1501	182	8.	1	JAN	1616	257	26.
1	JAN	1232	33	4.	1	JAN	1347	108	5.	1	JAN	1502	183	8.	1	JAN	1617	258	20.
1	JAN	1233	34	4.	1	JAN	1348	109	5.	1	JAN	1503	184	8.	1	JAN	1618	259	14.
1	JAN	1234	35	4.	1	JAN	1349	110	5.	1	JAN	1504	185	8.	1	JAN	1619	260	14.
1	JAN	1235	36	4.	1	JAN	1350	111	5.	1	JAN	1505	186	9.	1	JAN	1620	261	13.
1	JAN	1236	37	4.	1	JAN	1351	112	5.	1	JAN	1506	187	9.	1	JAN	1621	262	13.
1	JAN	1237	38	4.	1	JAN	1352	113	5.	1	JAN	1507	188	9.	1	JAN	1622	263	12.
1	JAN	1238	39	4.	1	JAN	1353	114	5.	1	JAN	1508	189	9.	1	JAN	1623	264	12.
1	JAN	1239	40	4.	1	JAN	1354	115	5.	1	JAN	1509	190	9.	1	JAN	1624	265	12.
1	JAN	1240	41	4.	1	JAN	1355	116	5.	1	JAN	1510	191	9.	1	JAN	1625	266	11.
1	JAN	1241	42	4.	1	JAN	1356	117	5.	1	JAN	1511	192	9.	1	JAN	1626	267	11.
1	JAN	1242	43	4.	1	JAN	1357	118	5.	1	JAN	1512	193	9.	1	JAN	1627	268	11.
1	JAN	1243	44	4.	1	JAN	1358	119	5.	1	JAN	1513	194	10.	1	JAN	1628	269	10.
1	JAN	1244	45	4.	1	JAN	1359	120	5.	1	JAN	1514	195	10.	1	JAN	1629	270	10.
1	JAN	1245	46	4.	1	JAN	1400	121	5.	1	JAN	1515	196	10.	1	JAN	1630	271	9.
1	JAN	1246	47	4.	1	JAN	1401	122	5.	1	JAN	1516	197	10.	1	JAN	1631	272	9.
1	JAN	1247	48	4.	1	JAN	1402	123	5.	1	JAN	1517	198	10.	1	JAN	1632	273	9.
1	JAN	1248	49	4.	1	JAN	1403	124	5.	1	JAN	1518	199	10.	1	JAN	1633	274	9.
1	JAN	1249	50	4.	1	JAN	1404	125	6.	1	JAN	1519	200	11.	1	JAN	1634	275	9.
1	JAN	1250	51	4.	1	JAN	1405	126	6.	1	JAN	1520	201	11.	1	JAN	1635	276	8.
1	JAN	1251	52	4.	1	JAN	1406	127	6.	1	JAN	1521	202	11.	1	JAN	1636	277	8.
1	JAN	1252	53	4.	1	JAN	1407	128	6.	1	JAN	1522	203	11.	1	JAN	1637	278	8.

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    1 JAN 1253   54       4.   *    1 JAN 1408  129       6.   *    1 JAN 1523  204       11.   *    1 JAN 1638  279       8.
    1 JAN 1254   55       4.   *    1 JAN 1409  130       6.   *    1 JAN 1524  205       11.   *    1 JAN 1639  280       8.
    1 JAN 1255   56       4.   *    1 JAN 1410  131       6.   *    1 JAN 1525  206       11.   *    1 JAN 1640  281       8.
    1 JAN 1256   57       4.   *    1 JAN 1411  132       6.   *    1 JAN 1526  207       12.   *    1 JAN 1641  282       8.
    1 JAN 1257   58       4.   *    1 JAN 1412  133       6.   *    1 JAN 1527  208       12.   *    1 JAN 1642  283       7.
    1 JAN 1258   59       4.   *    1 JAN 1413  134       6.   *    1 JAN 1528  209       12.   *    1 JAN 1643  284       7.
    1 JAN 1259   60       4.   *    1 JAN 1414  135       6.   *    1 JAN 1529  210       12.   *    1 JAN 1644  285       7.
    1 JAN 1300   61       4.   *    1 JAN 1415  136       6.   *    1 JAN 1530  211       12.   *    1 JAN 1645  286       7.
    1 JAN 1301   62       4.   *    1 JAN 1416  137       6.   *    1 JAN 1531  212       12.   *    1 JAN 1646  287       7.
    1 JAN 1302   63       4.   *    1 JAN 1417  138       6.   *    1 JAN 1532  213       13.   *    1 JAN 1647  288       7.
    1 JAN 1303   64       4.   *    1 JAN 1418  139       6.   *    1 JAN 1533  214       13.   *    1 JAN 1648  289       7.
    1 JAN 1304   65       4.   *    1 JAN 1419  140       6.   *    1 JAN 1534  215       14.   *    1 JAN 1649  290       7.
    1 JAN 1305   66       4.   *    1 JAN 1420  141       6.   *    1 JAN 1535  216       14.   *    1 JAN 1650  291       7.
    1 JAN 1306   67       4.   *    1 JAN 1421  142       6.   *    1 JAN 1536  217       15.   *    1 JAN 1651  292       7.
    1 JAN 1307   68       4.   *    1 JAN 1422  143       6.   *    1 JAN 1537  218       15.   *    1 JAN 1652  293       6.
    1 JAN 1308   69       4.   *    1 JAN 1423  144       6.   *    1 JAN 1538  219       16.   *    1 JAN 1653  294       6.
    1 JAN 1309   70       4.   *    1 JAN 1424  145       6.   *    1 JAN 1539  220       16.   *    1 JAN 1654  295       6.
    1 JAN 1310   71       4.   *    1 JAN 1425  146       6.   *    1 JAN 1540  221       17.   *    1 JAN 1655  296       6.
    1 JAN 1311   72       4.   *    1 JAN 1426  147       6.   *    1 JAN 1541  222       17.   *    1 JAN 1656  297       6.
    1 JAN 1312   73       4.   *    1 JAN 1427  148       6.   *    1 JAN 1542  223       18.   *    1 JAN 1657  298       6.
    1 JAN 1313   74       4.   *    1 JAN 1428  149       6.   *    1 JAN 1543  224       17.   *    1 JAN 1658  299       6.
    1 JAN 1314   75       4.   *    1 JAN 1429  150       6.   *    1 JAN 1544  225       17.   *    1 JAN 1659  300       6.
                          *                                       *                                 *
 ********************************************************************************************************************************************************

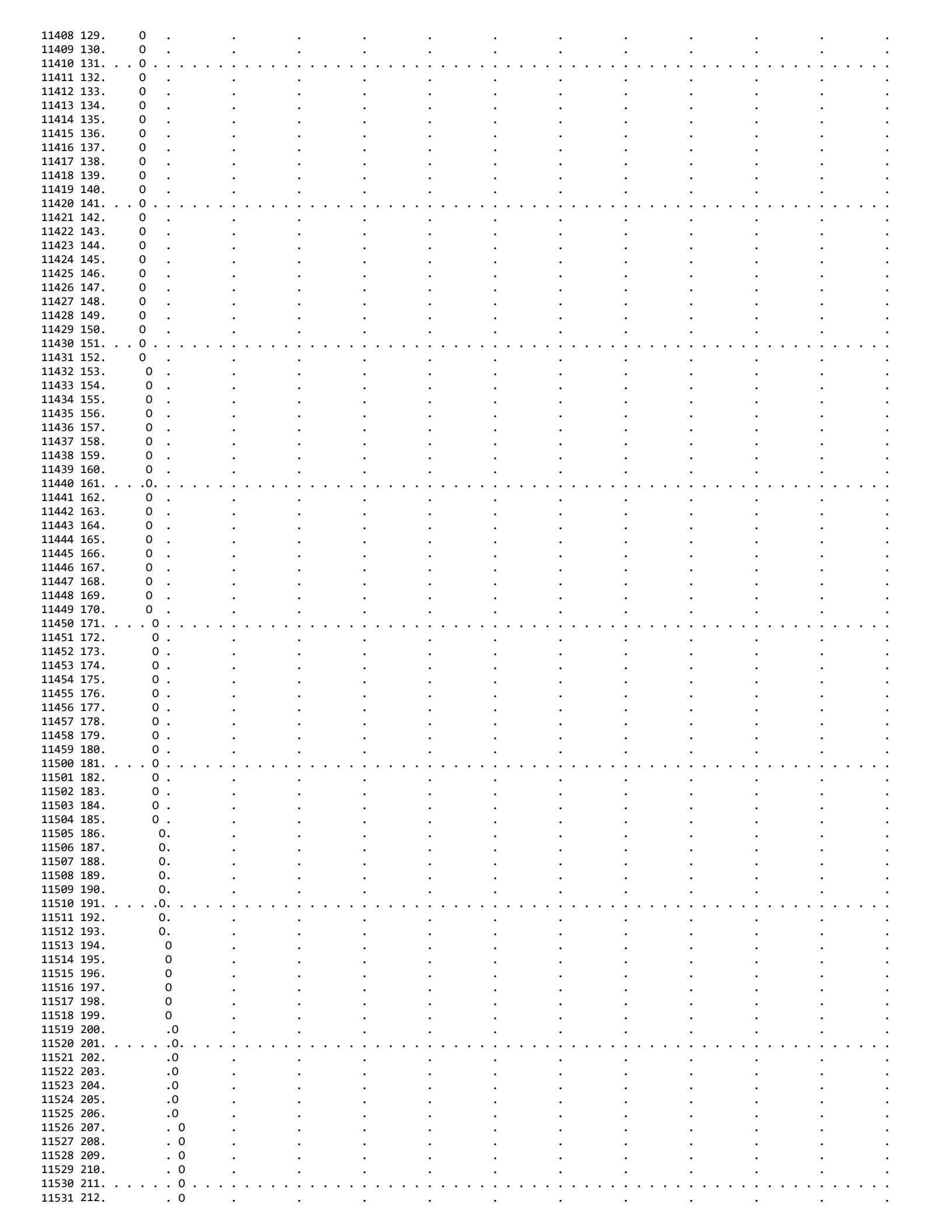
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR      4.98-HR
+   (CFS)       (HR)
                      (CFS)
+      98.      4.10                  11.         11.         11.         11.
                          (INCHES)   1.463       1.463       1.463       1.463
                           (AC-FT)     5.          5.          5.          5.

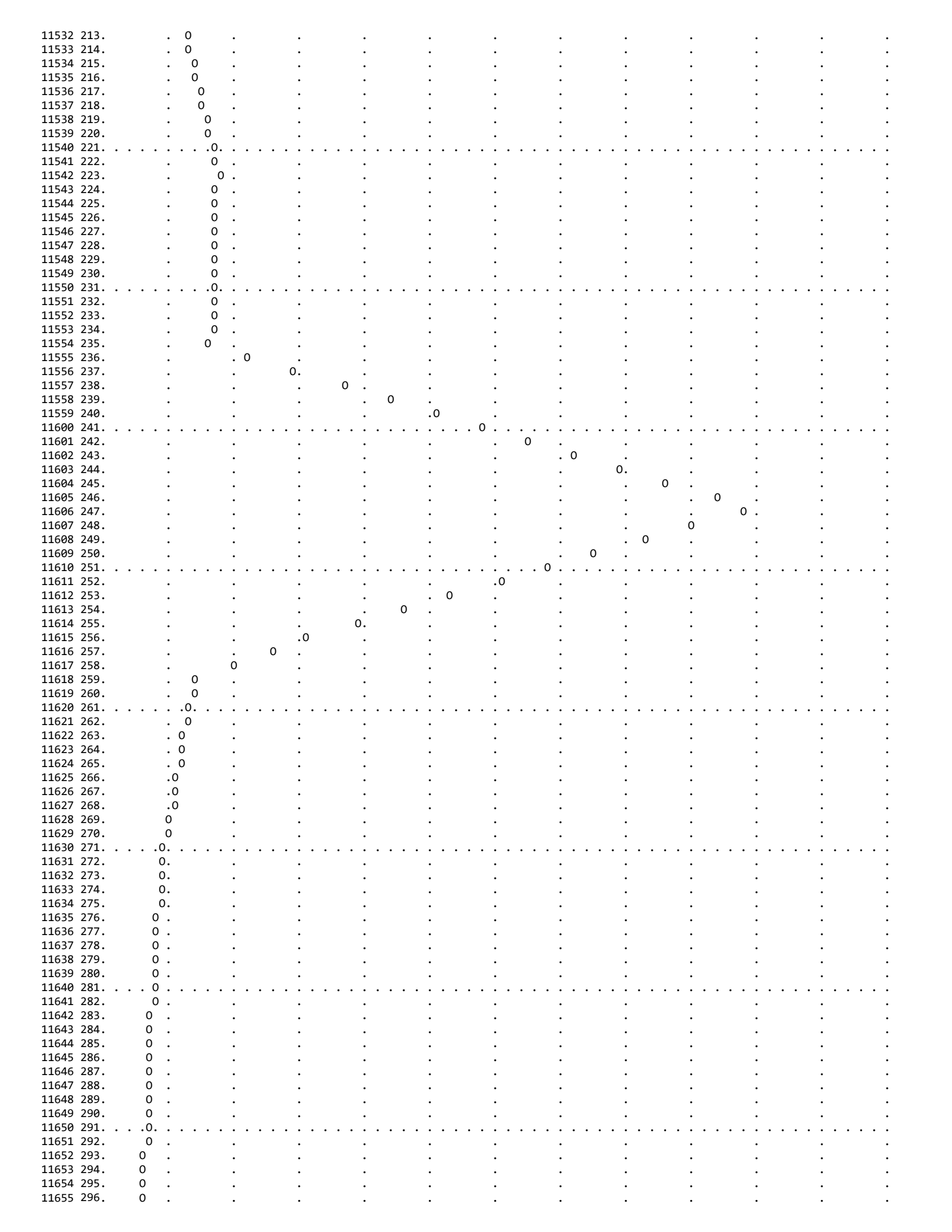
                         CUMULATIVE AREA =     .06 SQ MI

1                                                    STATION    VAULT

                        (O) OUTFLOW
          0.       10.       20.       30.       40.       50.       60.       70.       80.       90.      100.        0.        0.
 DAHRMN PER
  11200   1.-O-------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  11201   2. O       .         .         .         .         .         .         .         .         .         .         .         .
  11202   3. O       .         .         .         .         .         .         .         .         .         .         .         .
  11203   4.  O      .         .         .         .         .         .         .         .         .         .         .         .
  11204   5.  O      .         .         .         .         .         .         .         .         .         .         .         .
  11205   6.  O      .         .         .         .         .         .         .         .         .         .         .         .
  11206   7.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11207   8.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11208   9.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11209  10.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11210  11. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11211  12.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11212  13.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11213  14.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11214  15.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11215  16.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11216  17.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11217  18.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11218  19.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11219  20.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11220  21. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11221  22.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11222  23.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11223  24.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11224  25.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11225  26.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11226  27.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11227  28.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11228  29.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11229  30.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11230  31. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11231  32.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11232  33.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11233  34.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11234  35.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11235  36.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11236  37.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11237  38.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11238  39.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11239  40.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11240  41. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11241  42.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11242  43.   O     .         .         .         .         .         .         .         .         .         .         .         .
  11243  44.   O     .         .         .         .         .         .         .         .         .         .         .         .
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11244  45.   O     .       .       .       .       .       .       .       .       .       .       .       .
11245  46.   O     .       .       .       .       .       .       .       .       .       .       .       .
11246  47.   O     .       .       .       .       .       .       .       .       .       .       .       .
11247  48.   O     .       .       .       .       .       .       .       .       .       .       .       .
11248  49.   O     .       .       .       .       .       .       .       .       .       .       .       .
11249  50.   O     .       .       .       .       .       .       .       .       .       .       .       .
11250  51. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11251  52.   O     .       .       .       .       .       .       .       .       .       .       .       .
11252  53.   O     .       .       .       .       .       .       .       .       .       .       .       .
11253  54.   O     .       .       .       .       .       .       .       .       .       .       .       .
11254  55.   O     .       .       .       .       .       .       .       .       .       .       .       .
11255  56.   O     .       .       .       .       .       .       .       .       .       .       .       .
11256  57.   O     .       .       .       .       .       .       .       .       .       .       .       .
11257  58.   O     .       .       .       .       .       .       .       .       .       .       .       .
11258  59.   O     .       .       .       .       .       .       .       .       .       .       .       .
11259  60.   O     .       .       .       .       .       .       .       .       .       .       .       .
11300  61. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11301  62.   O     .       .       .       .       .       .       .       .       .       .       .       .
11302  63.   O     .       .       .       .       .       .       .       .       .       .       .       .
11303  64.   O     .       .       .       .       .       .       .       .       .       .       .       .
11304  65.   O     .       .       .       .       .       .       .       .       .       .       .       .
11305  66.   O     .       .       .       .       .       .       .       .       .       .       .       .
11306  67.   O     .       .       .       .       .       .       .       .       .       .       .       .
11307  68.   O     .       .       .       .       .       .       .       .       .       .       .       .
11308  69.   O     .       .       .       .       .       .       .       .       .       .       .       .
11309  70.   O     .       .       .       .       .       .       .       .       .       .       .       .
11310  71. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11311  72.   O     .       .       .       .       .       .       .       .       .       .       .       .
11312  73.   O     .       .       .       .       .       .       .       .       .       .       .       .
11313  74.   O     .       .       .       .       .       .       .       .       .       .       .       .
11314  75.   O     .       .       .       .       .       .       .       .       .       .       .       .
11315  76.   O     .       .       .       .       .       .       .       .       .       .       .       .
11316  77.   O     .       .       .       .       .       .       .       .       .       .       .       .
11317  78.   O     .       .       .       .       .       .       .       .       .       .       .       .
11318  79.    O    .       .       .       .       .       .       .       .       .       .       .       .
11319  80.    O    .       .       .       .       .       .       .       .       .       .       .       .
11320  81. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11321  82.    O    .       .       .       .       .       .       .       .       .       .       .       .
11322  83.    O    .       .       .       .       .       .       .       .       .       .       .       .
11323  84.    O    .       .       .       .       .       .       .       .       .       .       .       .
11324  85.    O    .       .       .       .       .       .       .       .       .       .       .       .
11325  86.    O    .       .       .       .       .       .       .       .       .       .       .       .
11326  87.    O    .       .       .       .       .       .       .       .       .       .       .       .
11327  88.    O    .       .       .       .       .       .       .       .       .       .       .       .
11328  89.    O    .       .       .       .       .       .       .       .       .       .       .       .
11329  90.    O    .       .       .       .       .       .       .       .       .       .       .       .
11330  91. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11331  92.    O    .       .       .       .       .       .       .       .       .       .       .       .
11332  93.    O    .       .       .       .       .       .       .       .       .       .       .       .
11333  94.    O    .       .       .       .       .       .       .       .       .       .       .       .
11334  95.    O    .       .       .       .       .       .       .       .       .       .       .       .
11335  96.    O    .       .       .       .       .       .       .       .       .       .       .       .
11336  97.    O    .       .       .       .       .       .       .       .       .       .       .       .
11337  98.    O    .       .       .       .       .       .       .       .       .       .       .       .
11338  99.    O    .       .       .       .       .       .       .       .       .       .       .       .
11339 100.    O    .       .       .       .       .       .       .       .       .       .       .       .
11340 101. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11341 102.    O    .       .       .       .       .       .       .       .       .       .       .       .
11342 103.    O    .       .       .       .       .       .       .       .       .       .       .       .
11343 104.    O    .       .       .       .       .       .       .       .       .       .       .       .
11344 105.    O    .       .       .       .       .       .       .       .       .       .       .       .
11345 106.    O    .       .       .       .       .       .       .       .       .       .       .       .
11346 107.    O    .       .       .       .       .       .       .       .       .       .       .       .
11347 108.    O    .       .       .       .       .       .       .       .       .       .       .       .
11348 109.    O    .       .       .       .       .       .       .       .       .       .       .       .
11349 110.    O    .       .       .       .       .       .       .       .       .       .       .       .
11350 111. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11351 112.    O    .       .       .       .       .       .       .       .       .       .       .       .
11352 113.    O    .       .       .       .       .       .       .       .       .       .       .       .
11353 114.    O    .       .       .       .       .       .       .       .       .       .       .       .
11354 115.    O    .       .       .       .       .       .       .       .       .       .       .       .
11355 116.    O    .       .       .       .       .       .       .       .       .       .       .       .
11356 117.    O    .       .       .       .       .       .       .       .       .       .       .       .
11357 118.    O    .       .       .       .       .       .       .       .       .       .       .       .
11358 119.    O    .       .       .       .       .       .       .       .       .       .       .       .
11359 120.    O    .       .       .       .       .       .       .       .       .       .       .       .
11400 121. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11401 122.    O    .       .       .       .       .       .       .       .       .       .       .       .
11402 123.    O    .       .       .       .       .       .       .       .       .       .       .       .
11403 124.    O    .       .       .       .       .       .       .       .       .       .       .       .
11404 125.     O   .       .       .       .       .       .       .       .       .       .       .       .
11405 126.     O   .       .       .       .       .       .       .       .       .       .       .       .
11406 127.     O   .       .       .       .       .       .       .       .       .       .       .       .
11407 128.     O   .       .       .       .       .       .       .       .       .       .       .       .
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 11656 297.     O   .         .         .         .         .         .         .         .         .         .         .         .
 11657 298.     O   .         .         .         .         .         .         .         .         .         .         .         .
 11658 299.     O   .         .         .         .         .         .         .         .         .         .         .         .
 11659 300.-----O---.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1


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           **************
           *            *
  42 KK    *     VAULT  *     300
           *            *
           **************

  43 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           2  PRINT CONTROL
                      IPLOT           2  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         300  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .017  TIME INTERVAL IN HOURS

                         VAULT 300

              HYDROGRAPH ROUTING DATA

  45 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC        5.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

  46 SV            STORAGE          .0        .2        .5        .9       1.2       1.5       1.7       1.8       2.0       2.1
                                   2.3       2.5       2.6       2.8       3.0       3.1       3.3       3.4       3.6       3.8

  48 SQ          DISCHARGE          0.        1.        1.        1.        1.        1.        2.        4.        6.        8.
                                    9.        9.       12.       17.       22.       25.       34.       48.       64.       84.

  50 SE          ELEVATION        .00      1.00      2.00      3.00      4.00      5.00      5.50      6.00      6.50      7.00
                                 7.50      8.00      8.50      9.00      9.50     10.00     10.50     11.00     11.50     12.00

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                                                HYDROGRAPH AT STATION    VAULT

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                                          *                                                  *                                                  *
 DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                          *                                                  *
  1 JAN 1200   1       1.      1.5     5.0 *  1 JAN 1340 101       3.      1.8     5.8 *  1 JAN 1520 201       7.      2.1     6.8
  1 JAN 1201   2       1.      1.5     5.0 *  1 JAN 1341 102       3.      1.8     5.8 *  1 JAN 1521 202       7.      2.1     6.8
  1 JAN 1202   3       1.      1.5     5.0 *  1 JAN 1342 103       3.      1.8     5.8 *  1 JAN 1522 203       7.      2.1     6.8
  1 JAN 1203   4       1.      1.5     5.0 *  1 JAN 1343 104       3.      1.8     5.9 *  1 JAN 1523 204       7.      2.1     6.8
  1 JAN 1204   5       1.      1.5     5.0 *  1 JAN 1344 105       3.      1.8     5.9 *  1 JAN 1524 205       7.      2.1     6.8
  1 JAN 1205   6       1.      1.5     5.0 *  1 JAN 1345 106       3.      1.8     5.9 *  1 JAN 1525 206       7.      2.1     6.9
  1 JAN 1206   7       1.      1.5     5.0 *  1 JAN 1346 107       3.      1.8     5.9 *  1 JAN 1526 207       7.      2.1     6.9
  1 JAN 1207   8       1.      1.5     5.0 *  1 JAN 1347 108       3.      1.8     5.9 *  1 JAN 1527 208       7.      2.1     6.9
  1 JAN 1208   9       1.      1.5     5.1 *  1 JAN 1348 109       3.      1.8     5.9 *  1 JAN 1528 209       7.      2.1     6.9
  1 JAN 1209  10       1.      1.5     5.1 *  1 JAN 1349 110       3.      1.8     5.9 *  1 JAN 1529 210       8.      2.1     6.9
  1 JAN 1210  11       1.      1.5     5.1 *  1 JAN 1350 111       3.      1.8     5.9 *  1 JAN 1530 211       8.      2.1     7.0
  1 JAN 1211  12       1.      1.5     5.1 *  1 JAN 1351 112       3.      1.8     5.9 *  1 JAN 1531 212       8.      2.1     7.0
  1 JAN 1212  13       1.      1.5     5.1 *  1 JAN 1352 113       3.      1.8     5.9 *  1 JAN 1532 213       8.      2.1     7.0
  1 JAN 1213  14       1.      1.5     5.1 *  1 JAN 1353 114       3.      1.8     5.9 *  1 JAN 1533 214       8.      2.2     7.0
  1 JAN 1214  15       1.      1.5     5.1 *  1 JAN 1354 115       3.      1.8     5.9 *  1 JAN 1534 215       8.      2.2     7.0
  1 JAN 1215  16       1.      1.5     5.1 *  1 JAN 1355 116       3.      1.8     5.9 *  1 JAN 1535 216       8.      2.2     7.1
  1 JAN 1216  17       1.      1.5     5.1 *  1 JAN 1356 117       3.      1.8     6.0 *  1 JAN 1536 217       8.      2.2     7.1
  1 JAN 1217  18       1.      1.5     5.1 *  1 JAN 1357 118       3.      1.8     6.0 *  1 JAN 1537 218       8.      2.2     7.1
  1 JAN 1218  19       1.      1.5     5.1 *  1 JAN 1358 119       3.      1.8     6.0 *  1 JAN 1538 219       8.      2.2     7.2
  1 JAN 1219  20       2.      1.5     5.2 *  1 JAN 1359 120       4.      1.8     6.0 *  1 JAN 1539 220       8.      2.2     7.2
  1 JAN 1220  21       2.      1.5     5.2 *  1 JAN 1400 121       4.      1.8     6.0 *  1 JAN 1540 221       8.      2.2     7.2
  1 JAN 1221  22       2.      1.6     5.2 *  1 JAN 1401 122       4.      1.8     6.0 *  1 JAN 1541 222       8.      2.2     7.3
  1 JAN 1222  23       2.      1.6     5.2 *  1 JAN 1402 123       4.      1.8     6.0 *  1 JAN 1542 223       8.      2.2     7.3
  1 JAN 1223  24       2.      1.6     5.2 *  1 JAN 1403 124       4.      1.8     6.0 *  1 JAN 1543 224       8.      2.3     7.3
  1 JAN 1224  25       2.      1.6     5.2 *  1 JAN 1404 125       4.      1.8     6.0 *  1 JAN 1544 225       8.      2.3     7.4
  1 JAN 1225  26       2.      1.6     5.2 *  1 JAN 1405 126       4.      1.8     6.0 *  1 JAN 1545 226       8.      2.3     7.4
  1 JAN 1226  27       2.      1.6     5.2 *  1 JAN 1406 127       4.      1.8     6.0 *  1 JAN 1546 227       9.      2.3     7.5
  1 JAN 1227  28       2.      1.6     5.2 *  1 JAN 1407 128       4.      1.8     6.0 *  1 JAN 1547 228       9.      2.3     7.5
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1	JAN	1228	29	2.	1.6	5.2	*	1	JAN	1408	129	4.	1.8	6.0	*	1	JAN	1548	229	9.	2.3	7.5
1	JAN	1229	30	2.	1.6	5.2	*	1	JAN	1409	130	4.	1.8	6.1	*	1	JAN	1549	230	9.	2.3	7.6
1	JAN	1230	31	2.	1.6	5.3	*	1	JAN	1410	131	4.	1.8	6.1	*	1	JAN	1550	231	9.	2.3	7.6
1	JAN	1231	32	2.	1.6	5.3	*	1	JAN	1411	132	4.	1.8	6.1	*	1	JAN	1551	232	9.	2.3	7.6
1	JAN	1232	33	2.	1.6	5.3	*	1	JAN	1412	133	4.	1.8	6.1	*	1	JAN	1552	233	9.	2.4	7.7
1	JAN	1233	34	2.	1.6	5.3	*	1	JAN	1413	134	4.	1.8	6.1	*	1	JAN	1553	234	9.	2.4	7.7
1	JAN	1234	35	2.	1.6	5.3	*	1	JAN	1414	135	4.	1.9	6.1	*	1	JAN	1554	235	9.	2.4	7.7
1	JAN	1235	36	2.	1.6	5.3	*	1	JAN	1415	136	4.	1.9	6.1	*	1	JAN	1555	236	9.	2.4	7.8
1	JAN	1236	37	2.	1.6	5.3	*	1	JAN	1416	137	4.	1.9	6.1	*	1	JAN	1556	237	9.	2.4	7.8
1	JAN	1237	38	2.	1.6	5.3	*	1	JAN	1417	138	4.	1.9	6.1	*	1	JAN	1557	238	9.	2.4	7.9
1	JAN	1238	39	2.	1.6	5.3	*	1	JAN	1418	139	4.	1.9	6.1	*	1	JAN	1558	239	10.	2.5	8.1
1	JAN	1239	40	2.	1.6	5.3	*	1	JAN	1419	140	4.	1.9	6.1	*	1	JAN	1559	240	11.	2.5	8.2
1	JAN	1240	41	2.	1.6	5.3	*	1	JAN	1420	141	4.	1.9	6.1	*	1	JAN	1600	241	12.	2.6	8.4
1	JAN	1241	42	2.	1.6	5.3	*	1	JAN	1421	142	4.	1.9	6.1	*	1	JAN	1601	242	13.	2.7	8.6
1	JAN	1242	43	2.	1.6	5.4	*	1	JAN	1422	143	4.	1.9	6.2	*	1	JAN	1602	243	15.	2.7	8.9
1	JAN	1243	44	2.	1.6	5.4	*	1	JAN	1423	144	4.	1.9	6.2	*	1	JAN	1603	244	18.	2.8	9.1
1	JAN	1244	45	2.	1.6	5.4	*	1	JAN	1424	145	4.	1.9	6.2	*	1	JAN	1604	245	21.	2.9	9.4
1	JAN	1245	46	2.	1.6	5.4	*	1	JAN	1425	146	4.	1.9	6.2	*	1	JAN	1605	246	23.	3.0	9.7
1	JAN	1246	47	2.	1.6	5.4	*	1	JAN	1426	147	4.	1.9	6.2	*	1	JAN	1606	247	25.	3.1	10.0
1	JAN	1247	48	2.	1.6	5.4	*	1	JAN	1427	148	4.	1.9	6.2	*	1	JAN	1607	248	30.	3.2	10.3
1	JAN	1248	49	2.	1.6	5.4	*	1	JAN	1428	149	4.	1.9	6.2	*	1	JAN	1608	249	34.	3.3	10.5
1	JAN	1249	50	2.	1.6	5.4	*	1	JAN	1429	150	4.	1.9	6.2	*	1	JAN	1609	250	38.	3.3	10.7
1	JAN	1250	51	2.	1.6	5.4	*	1	JAN	1430	151	4.	1.9	6.2	*	1	JAN	1610	251	42.	3.4	10.8
1	JAN	1251	52	2.	1.6	5.4	*	1	JAN	1431	152	4.	1.9	6.2	*	1	JAN	1611	252	45.	3.4	10.9
1	JAN	1252	53	2.	1.6	5.4	*	1	JAN	1432	153	5.	1.9	6.2	*	1	JAN	1612	253	46.	3.4	10.9
1	JAN	1253	54	2.	1.6	5.5	*	1	JAN	1433	154	5.	1.9	6.2	*	1	JAN	1613	254	46.	3.4	11.0
1	JAN	1254	55	2.	1.6	5.5	*	1	JAN	1434	155	5.	1.9	6.3	*	1	JAN	1614	255	46.	3.4	10.9
1	JAN	1255	56	2.	1.6	5.5	*	1	JAN	1435	156	5.	1.9	6.3	*	1	JAN	1615	256	45.	3.4	10.9
1	JAN	1256	57	2.	1.7	5.5	*	1	JAN	1436	157	5.	1.9	6.3	*	1	JAN	1616	257	43.	3.4	10.8
1	JAN	1257	58	2.	1.7	5.5	*	1	JAN	1437	158	5.	1.9	6.3	*	1	JAN	1617	258	41.	3.4	10.8
1	JAN	1258	59	2.	1.7	5.5	*	1	JAN	1438	159	5.	1.9	6.3	*	1	JAN	1618	259	38.	3.3	10.7
1	JAN	1259	60	2.	1.7	5.5	*	1	JAN	1439	160	5.	1.9	6.3	*	1	JAN	1619	260	36.	3.3	10.6
1	JAN	1300	61	2.	1.7	5.5	*	1	JAN	1440	161	5.	1.9	6.3	*	1	JAN	1620	261	33.	3.3	10.5
1	JAN	1301	62	2.	1.7	5.5	*	1	JAN	1441	162	5.	1.9	6.3	*	1	JAN	1621	262	32.	3.2	10.4
1	JAN	1302	63	2.	1.7	5.5	*	1	JAN	1442	163	5.	1.9	6.3	*	1	JAN	1622	263	31.	3.2	10.3
1	JAN	1303	64	2.	1.7	5.5	*	1	JAN	1443	164	5.	1.9	6.3	*	1	JAN	1623	264	29.	3.2	10.2
1	JAN	1304	65	2.	1.7	5.5	*	1	JAN	1444	165	5.	1.9	6.3	*	1	JAN	1624	265	28.	3.2	10.2
1	JAN	1305	66	2.	1.7	5.6	*	1	JAN	1445	166	5.	1.9	6.3	*	1	JAN	1625	266	27.	3.1	10.1
1	JAN	1306	67	2.	1.7	5.6	*	1	JAN	1446	167	5.	1.9	6.4	*	1	JAN	1626	267	26.	3.1	10.0
1	JAN	1307	68	2.	1.7	5.6	*	1	JAN	1447	168	5.	1.9	6.4	*	1	JAN	1627	268	25.	3.1	10.0
1	JAN	1308	69	2.	1.7	5.6	*	1	JAN	1448	169	5.	1.9	6.4	*	1	JAN	1628	269	25.	3.1	9.9
1	JAN	1309	70	2.	1.7	5.6	*	1	JAN	1449	170	5.	1.9	6.4	*	1	JAN	1629	270	24.	3.1	9.8
1	JAN	1310	71	2.	1.7	5.6	*	1	JAN	1450	171	5.	1.9	6.4	*	1	JAN	1630	271	24.	3.0	9.8
1	JAN	1311	72	2.	1.7	5.6	*	1	JAN	1451	172	5.	2.0	6.4	*	1	JAN	1631	272	24.	3.0	9.7
1	JAN	1312	73	2.	1.7	5.6	*	1	JAN	1452	173	5.	2.0	6.4	*	1	JAN	1632	273	23.	3.0	9.7
1	JAN	1313	74	2.	1.7	5.6	*	1	JAN	1453	174	5.	2.0	6.4	*	1	JAN	1633	274	23.	3.0	9.6
1	JAN	1314	75	2.	1.7	5.6	*	1	JAN	1454	175	5.	2.0	6.4	*	1	JAN	1634	275	22.	3.0	9.5
1	JAN	1315	76	3.	1.7	5.6	*	1	JAN	1455	176	5.	2.0	6.5	*	1	JAN	1635	276	22.	2.9	9.5
1	JAN	1316	77	3.	1.7	5.6	*	1	JAN	1456	177	5.	2.0	6.5	*	1	JAN	1636	277	21.	2.9	9.4
1	JAN	1317	78	3.	1.7	5.7	*	1	JAN	1457	178	5.	2.0	6.5	*	1	JAN	1637	278	21.	2.9	9.4
1	JAN	1318	79	3.	1.7	5.7	*	1	JAN	1458	179	5.	2.0	6.5	*	1	JAN	1638	279	20.	2.9	9.3
1	JAN	1319	80	3.	1.7	5.7	*	1	JAN	1459	180	6.	2.0	6.5	*	1	JAN	1639	280	20.	2.9	9.3
1	JAN	1320	81	3.	1.7	5.7	*	1	JAN	1500	181	6.	2.0	6.5	*	1	JAN	1640	281	19.	2.9	9.2
1	JAN	1321	82	3.	1.7	5.7	*	1	JAN	1501	182	6.	2.0	6.5	*	1	JAN	1641	282	19.	2.8	9.2
1	JAN	1322	83	3.	1.7	5.7	*	1	JAN	1502	183	6.	2.0	6.5	*	1	JAN	1642	283	18.	2.8	9.1
1	JAN	1323	84	3.	1.7	5.7	*	1	JAN	1503	184	6.	2.0	6.5	*	1	JAN	1643	284	17.	2.8	9.1
1	JAN	1324	85	3.	1.7	5.7	*	1	JAN	1504	185	6.	2.0	6.6	*	1	JAN	1644	285	17.	2.8	9.0
1	JAN	1325	86	3.	1.7	5.7	*	1	JAN	1505	186	6.	2.0	6.6	*	1	JAN	1645	286	17.	2.8	9.0
1	JAN	1326	87	3.	1.7	5.7	*	1	JAN	1506	187	6.	2.0	6.6	*	1	JAN	1646	287	16.	2.8	9.0
1	JAN	1327	88	3.	1.7	5.7	*	1	JAN	1507	188	6.	2.0	6.6	*	1	JAN	1647	288	16.	2.8	8.9
1	JAN	1328	89	3.	1.7	5.7	*	1	JAN	1508	189	6.	2.0	6.6	*	1	JAN	1648	289	16.	2.8	8.9
1	JAN	1329	90	3.	1.7	5.7	*	1	JAN	1509	190	6.	2.0	6.6	*	1	JAN	1649	290	15.	2.7	8.8
1	JAN	1330	91	3.	1.7	5.8	*	1	JAN	1510	191	6.	2.0	6.6	*	1	JAN	1650	291	15.	2.7	8.8
1	JAN	1331	92	3.	1.7	5.8	*	1	JAN	1511	192	6.	2.0	6.6	*	1	JAN	1651	292	15.	2.7	8.8
1	JAN	1332	93	3.	1.7	5.8	*	1	JAN	1512	193	6.	2.0	6.7	*	1	JAN	1652	293	14.	2.7	8.7
1	JAN	1333	94	3.	1.7	5.8	*	1	JAN	1513	194	6.	2.0	6.7	*	1	JAN	1653	294	14.	2.7	8.7
1	JAN	1334	95	3.	1.8	5.8	*	1	JAN	1514	195	6.	2.0	6.7	*	1	JAN	1654	295	14.	2.7	8.7
1	JAN	1335	96	3.	1.8	5.8	*	1	JAN	1515	196	6.	2.0	6.7	*	1	JAN	1655	296	13.	2.7	8.6
1	JAN	1336	97	3.	1.8	5.8	*	1	JAN	1516	197	6.	2.1	6.7	*	1	JAN	1656	297	13.	2.7	8.6
1	JAN	1337	98	3.	1.8	5.8	*	1	JAN	1517	198	7.	2.1	6.7	*	1	JAN	1657	298	13.	2.7	8.6
1	JAN	1338	99	3.	1.8	5.8	*	1	JAN	1518	199	7.	2.1	6.7	*	1	JAN	1658	299	13.	2.6	8.6
1	JAN	1339	100	3.	1.8	5.8	*	1	JAN	1519	200	7.	2.1	6.8	*	1	JAN	1659	300	12.	2.6	8.5

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	4.98-HR
+ (CFS)	(HR)					
		(CFS)				
+ 46.	4.22		8.	8.	8.	8.
		(INCHES)	1.093	1.093	1.093	1.093
		(AC-FT)	3.	3.	3.	3.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE

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                                    6-HR       24-HR       72-HR      4.98-HR
+  (AC-FT)      (HR)
       3.      4.22                   2.          2.          2.           2.

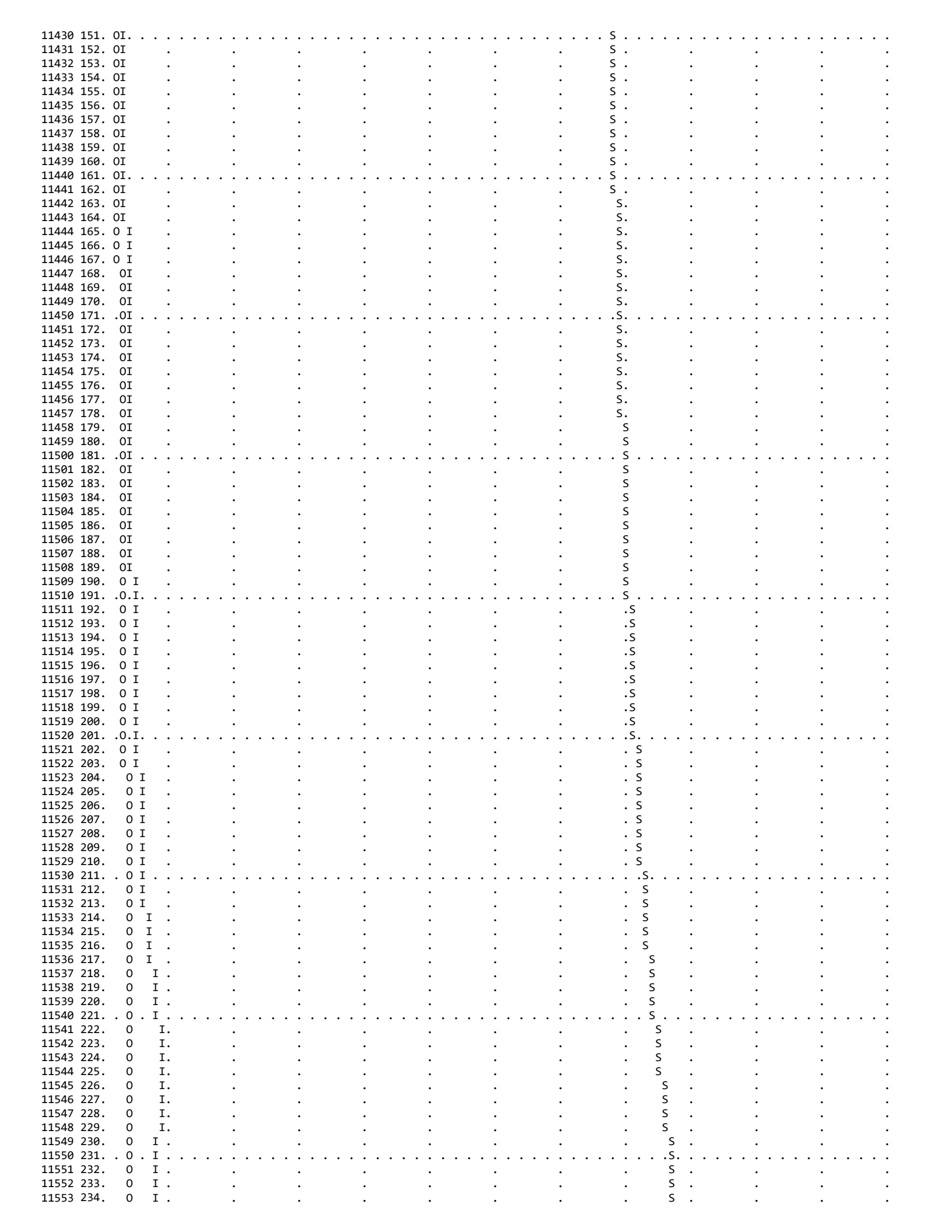
  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR      4.98-HR
+   (FEET)      (HR)
     10.96      4.22                6.78        6.78        6.78         6.78

                        CUMULATIVE AREA =     .06 SQ MI

1                                                    STATION    VAULT

                       (I) INFLOW,   (O) OUTFLOW
         0.       20.       40.       60.       80.      100.        0.        0.        0.        0.        0.        0.        0.
                                                                                  (S) STORAGE
         .0        .0        .0        .0        .0        .0       1.0       1.5       2.0       2.5       3.0       3.5        .0
 DAHRMN PER
  11200   1.I--------.---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.
  11201   2.I        .         .         .         .         .         .         S         .         .         .         .         .
  11202   3.I        .         .         .         .         .         .         S         .         .         .         .         .
  11203   4.I        .         .         .         .         .         .         S         .         .         .         .         .
  11204   5.I        .         .         .         .         .         .         S         .         .         .         .         .
  11205   6.OI       .         .         .         .         .         .         S         .         .         .         .         .
  11206   7.OI       .         .         .         .         .         .         S         .         .         .         .         .
  11207   8.OI       .         .         .         .         .         .         S         .         .         .         .         .
  11208   9.OI       .         .         .         .         .         .         S         .         .         .         .         .
  11209  10.OI       .         .         .         .         .         .         S         .         .         .         .         .
  11210  11.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
  11211  12.OI       .         .         .         .         .         .         S         .         .         .         .         .
  11212  13.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11213  14.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11214  15.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11215  16.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11216  17.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11217  18.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11218  19.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11219  20.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11220  21.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
  11221  22.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11222  23.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11223  24.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11224  25.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11225  26.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11226  27.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11227  28.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11228  29.OI       .         .         .         .         .         .        .S         .         .         .         .         .
  11229  30.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11230  31.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
  11231  32.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11232  33.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11233  34.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11234  35.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11235  36.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11236  37.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11237  38.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11238  39.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11239  40.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11240  41.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
  11241  42.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11242  43.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11243  44.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11244  45.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11245  46.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11246  47.OI       .         .         .         .         .         .         .S        .         .         .         .         .
  11247  48.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11248  49.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11249  50.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11250  51.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
  11251  52.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11252  53.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11253  54.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11254  55.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11255  56.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11256  57.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11257  58.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11258  59.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11259  60.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11300  61.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
  11301  62.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11302  63.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11303  64.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11304  65.OI       .         .         .         .         .         .          .S       .         .         .         .         .
  11305  66.OI       .         .         .         .         .         .           .S      .         .         .         .         .
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11306  67.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11307  68.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11308  69.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11309  70.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11310  71.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11311  72.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11312  73.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11313  74.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11314  75.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11315  76.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11316  77.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11317  78.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11318  79.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11319  80.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11320  81.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11321  82.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11322  83.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11323  84.OI      .       .       .       .       .       .       .    S    .       .       .       .       .       .
11324  85.OI      .       .       .       .       .       .       .    S    .       .       .       .       .       .
11325  86.OI      .       .       .       .       .       .       .    S    .       .       .       .       .       .
11326  87.OI      .       .       .       .       .       .       .    S    .       .       .       .       .       .
11327  88.OI      .       .       .       .       .       .       .    S    .       .       .       .       .       .
11328  89.OI      .       .       .       .       .       .       .    S    .       .       .       .       .       .
11329  90.OI      .       .       .       .       .       .       .    S    .       .       .       .       .       .
11330  91.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11331  92.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11332  93.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11333  94.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11334  95.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11335  96.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11336  97.OI      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11337  98. I      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11338  99. I      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11339 100. I      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11340 101. I . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11341 102. I      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11342 103. I      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11343 104. I      .       .       .       .       .       .       .   S     .       .       .       .       .       .
11344 105. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11345 106. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11346 107. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11347 108. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11348 109. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11349 110. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11350 111. OI. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11351 112. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11352 113. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11353 114. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11354 115. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11355 116. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11356 117. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11357 118. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11358 119. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11359 120. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11400 121. OI. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
11401 122. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11402 123. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11403 124. OI     .       .       .       .       .       .       .    S    .       .       .       .       .       .
11404 125. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11405 126. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11406 127. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11407 128. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11408 129. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11409 130. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11410 131. OI. . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11411 132. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11412 133. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11413 134. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11414 135. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11415 136. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11416 137. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11417 138. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11418 139. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11419 140. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11420 141. OI. . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11421 142. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11422 143. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11423 144. OI     .       .       .       .       .       .       .     S   .       .       .       .       .       .
11424 145. OI     .       .       .       .       .       .       .      S  .       .       .       .       .       .
11425 146. OI     .       .       .       .       .       .       .      S  .       .       .       .       .       .
11426 147. OI     .       .       .       .       .       .       .      S  .       .       .       .       .       .
11427 148. OI     .       .       .       .       .       .       .      S  .       .       .       .       .       .
11428 149. OI     .       .       .       .       .       .       .      S  .       .       .       .       .       .
11429 150. OI     .       .       .       .       .       .       .      S  .       .       .       .       .       .
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		SWV385_1	20.	4.08	2.	2.	2.	.01		
	HYDROGRAPH AT									
+		SWV367_1	79.	4.10	9.	9.	9.	.05		
	2 COMBINED AT									
+		VAULT	98.	4.10	11.	11.	11.	.06		

```
          ROUTED TO
+                         VAULT        46.    4.22          8.          8.          8.        .06
+                                                                                                  10.96        4.22


 *** NORMAL END OF HEC-1 ***
```

```
1****************************************                ****************************************
 *                                      *                *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                *          609 SECOND STREET           *
 *                                      *                *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   17FEB22  TIME  16:29:21  *                *           (916) 756-1104             *
 *                                      *                *                                      *
 ****************************************                ****************************************
```

Detention Routing Calculation for Basin 1400

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


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

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


1                                                HEC-1 INPUT                                                PAGE  1

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

 *** FREE ***
                        *DIAGRAM
              1         ID   SOUTH OTAY VTM; J-15013-C
              2         ID   DETENTION ANALYSIS FOR BASIN 3
              3         ID   FEBURARY 16, 2022 - FILE NAME: SWV3HD00.hc1
              4         IT       1 01JAN90    1200     300
              5         IO       5       0
                        *

              6         KKSWV1495_100YR.hc1
              7         KM   RUN DATE   2/17/2022
              8         KM   RATIONAL METHOD HYDROGRAPH PROGRAM
              9         KM   COPYRIGHT 1992, 2014, RICK ENGINEERING COMPANY
             10         KM   6HR RAINFALL IS 2 INCHES
             11         KM   RATIONAL METHOD RUNOFF COEFFICIENT IS 0.8
             12         KM   RATIONAL METHOD TIME OF CONCENTRATION IS 28 MIN.
             13         KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
             14         KM   IT 2 01JAN90 1200 200
             15         BA  0.0778
             16         IN      28 01JAN90    1134
             17         QI       0       0     5.1     5.4     6.2     6.7     8.2     9.3    13.7    30.3
             18         QI   58.11      11     7.3     5.7       0       0       0       0       0       0
             19         QI       0       0       0       0       0
                        *

             20         KK    BF14
             21         KO       2       2       0       0      21
             22         KM   BIOFILTRATION BASIN 1400
             23         RS       1    ELEV       1
             24         SV   0.285   0.467   0.658   0.757   0.859   0.962   1.068   1.177   1.288   1.401
             25         SV   1.517   1.635   1.756   1.879   2.005   2.133   2.264   2.398   2.534   2.674
             26         SQ   1.761   1.899   2.028   2.276   3.094   3.544   3.901   4.209   4.486   8.209
             27         SQ  14.789  23.225  28.795  33.257  38.689  44.721  48.872  59.689  76.496  97.167
             28         SE       0     0.5       1    1.25     1.5    1.75       2    2.25     2.5    2.75
             29         SE       3    3.25     3.5    3.75       4    4.25     4.5    4.75       5    5.25
                        *
             30         ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

    NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

      6    SWV1495_
                   V
```

```
              V
   20        BF14

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                                    ****************************************
 *                                      *                                   *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                   *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                                   *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                   *         609 SECOND STREET            *
 *                                      *                                   *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   17FEB22  TIME  16:29:21  *                                   *           (916) 756-1104             *
 *                                      *                                   *                                      *
 ****************************************                                    ****************************************



                         SOUTH OTAY VTM; J-15013-C
                         DETENTION ANALYSIS FOR BASIN 3
                         FEBURARY 16, 2022 - FILE NAME: SWV3HD00.hc1

   5 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           5  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN           1  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1JAN90  STARTING DATE
                       ITIME        1200  STARTING TIME
                          NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1JAN90  ENDING DATE
                      NDTIME        1659  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .02 HOURS
                       TOTAL TIME BASE    4.98 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT


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


            **************
            *            *
  20 KK     *      BF14  *
            *            *
            **************

  21 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           2  PRINT CONTROL
                       IPLOT           2  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                       IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                        IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                       ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                       ISAV2         300  LAST ORDINATE PUNCHED OR SAVED
                      TIMINT        .017  TIME INTERVAL IN HOURS

                         BIOFILTRATION BASIN 1400

              HYDROGRAPH ROUTING DATA

  23 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        ELEV  TYPE OF INITIAL CONDITION
                      RSVRIC        1.00  INITIAL CONDITION
                           X         .00 WORKING R AND D COEFFICIENT

  24 SV            STORAGE          .3        .5        .7        .8        .9       1.0       1.1       1.2       1.3       1.4
                                   1.5       1.6       1.8       1.9       2.0       2.1       2.3       2.4       2.5       2.7

  26 SQ          DISCHARGE          2.        2.        2.        2.        3.        4.        4.        4.        4.        8.
                                  15.       23.       29.       33.       39.       45.       49.       60.       76.       97.
```

28 SE ELEVATION .00 .50 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75
3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00 5.25

***

HYDROGRAPH AT STATION BF14

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JAN	1200	1	2.	.7	1.0	1	JAN	1340	101	4.	1.0	1.7	1	JAN	1520	201	11.	1.5	2.9
1	JAN	1201	2	2.	.7	1.0	1	JAN	1341	102	4.	1.0	1.7	1	JAN	1521	202	12.	1.5	2.9
1	JAN	1202	3	2.	.7	1.0	1	JAN	1342	103	4.	1.0	1.8	1	JAN	1522	203	12.	1.5	2.9
1	JAN	1203	4	2.	.6	1.0	1	JAN	1343	104	4.	1.0	1.8	1	JAN	1523	204	12.	1.5	2.9
1	JAN	1204	5	2.	.6	1.0	1	JAN	1344	105	4.	1.0	1.8	1	JAN	1524	205	13.	1.5	2.9
1	JAN	1205	6	2.	.6	1.0	1	JAN	1345	106	4.	1.0	1.8	1	JAN	1525	206	13.	1.5	2.9
1	JAN	1206	7	2.	.6	1.0	1	JAN	1346	107	4.	1.0	1.8	1	JAN	1526	207	13.	1.5	3.0
1	JAN	1207	8	2.	.6	1.0	1	JAN	1347	108	4.	1.0	1.8	1	JAN	1527	208	14.	1.5	3.0
1	JAN	1208	9	2.	.6	1.0	1	JAN	1348	109	4.	1.0	1.8	1	JAN	1528	209	14.	1.5	3.0
1	JAN	1209	10	2.	.6	1.0	1	JAN	1349	110	4.	1.0	1.8	1	JAN	1529	210	15.	1.5	3.0
1	JAN	1210	11	2.	.6	.9	1	JAN	1350	111	4.	1.0	1.8	1	JAN	1530	211	15.	1.5	3.0
1	JAN	1211	12	2.	.6	.9	1	JAN	1351	112	4.	1.0	1.8	1	JAN	1531	212	16.	1.5	3.0
1	JAN	1212	13	2.	.6	.9	1	JAN	1352	113	4.	1.0	1.9	1	JAN	1532	213	16.	1.5	3.0
1	JAN	1213	14	2.	.6	.9	1	JAN	1353	114	4.	1.0	1.9	1	JAN	1533	214	17.	1.5	3.1
1	JAN	1214	15	2.	.6	.9	1	JAN	1354	115	4.	1.0	1.9	1	JAN	1534	215	17.	1.6	3.1
1	JAN	1215	16	2.	.6	.9	1	JAN	1355	116	4.	1.0	1.9	1	JAN	1535	216	18.	1.6	3.1
1	JAN	1216	17	2.	.6	.9	1	JAN	1356	117	4.	1.0	1.9	1	JAN	1536	217	19.	1.6	3.1
1	JAN	1217	18	2.	.6	1.0	1	JAN	1357	118	4.	1.0	1.9	1	JAN	1537	218	19.	1.6	3.1
1	JAN	1218	19	2.	.6	1.0	1	JAN	1358	119	4.	1.0	1.9	1	JAN	1538	219	20.	1.6	3.1
1	JAN	1219	20	2.	.6	1.0	1	JAN	1359	120	4.	1.0	1.9	1	JAN	1539	220	20.	1.6	3.2
1	JAN	1220	21	2.	.6	1.0	1	JAN	1400	121	4.	1.0	1.9	1	JAN	1540	221	21.	1.6	3.2
1	JAN	1221	22	2.	.6	1.0	1	JAN	1401	122	4.	1.0	1.9	1	JAN	1541	222	21.	1.6	3.2
1	JAN	1222	23	2.	.6	1.0	1	JAN	1402	123	4.	1.0	2.0	1	JAN	1542	223	22.	1.6	3.2
1	JAN	1223	24	2.	.6	1.0	1	JAN	1403	124	4.	1.1	2.0	1	JAN	1543	224	23.	1.6	3.2
1	JAN	1224	25	2.	.7	1.0	1	JAN	1404	125	4.	1.1	2.0	1	JAN	1544	225	23.	1.6	3.2
1	JAN	1225	26	2.	.7	1.0	1	JAN	1405	126	4.	1.1	2.0	1	JAN	1545	226	24.	1.6	3.3
1	JAN	1226	27	2.	.7	1.0	1	JAN	1406	127	4.	1.1	2.0	1	JAN	1546	227	24.	1.7	3.3
1	JAN	1227	28	2.	.7	1.0	1	JAN	1407	128	4.	1.1	2.0	1	JAN	1547	228	24.	1.7	3.3
1	JAN	1228	29	2.	.7	1.0	1	JAN	1408	129	4.	1.1	2.0	1	JAN	1548	229	25.	1.7	3.3
1	JAN	1229	30	2.	.7	1.0	1	JAN	1409	130	4.	1.1	2.0	1	JAN	1549	230	25.	1.7	3.3
1	JAN	1230	31	2.	.7	1.0	1	JAN	1410	131	4.	1.1	2.0	1	JAN	1550	231	26.	1.7	3.4
1	JAN	1231	32	2.	.7	1.0	1	JAN	1411	132	4.	1.1	2.1	1	JAN	1551	232	26.	1.7	3.4
1	JAN	1232	33	2.	.7	1.1	1	JAN	1412	133	4.	1.1	2.1	1	JAN	1552	233	27.	1.7	3.4
1	JAN	1233	34	2.	.7	1.1	1	JAN	1413	134	4.	1.1	2.1	1	JAN	1553	234	28.	1.7	3.4
1	JAN	1234	35	2.	.7	1.1	1	JAN	1414	135	4.	1.1	2.1	1	JAN	1554	235	28.	1.7	3.5
1	JAN	1235	36	2.	.7	1.1	1	JAN	1415	136	4.	1.1	2.1	1	JAN	1555	236	29.	1.8	3.5
1	JAN	1236	37	2.	.7	1.1	1	JAN	1416	137	4.	1.1	2.1	1	JAN	1556	237	29.	1.8	3.5
1	JAN	1237	38	2.	.7	1.1	1	JAN	1417	138	4.	1.1	2.1	1	JAN	1557	238	30.	1.8	3.6
1	JAN	1238	39	2.	.7	1.1	1	JAN	1418	139	4.	1.1	2.1	1	JAN	1558	239	31.	1.8	3.6
1	JAN	1239	40	2.	.7	1.1	1	JAN	1419	140	4.	1.1	2.1	1	JAN	1559	240	31.	1.8	3.6
1	JAN	1240	41	2.	.7	1.1	1	JAN	1420	141	4.	1.1	2.2	1	JAN	1600	241	32.	1.8	3.7
1	JAN	1241	42	2.	.7	1.2	1	JAN	1421	142	4.	1.1	2.2	1	JAN	1601	242	32.	1.9	3.7
1	JAN	1242	43	2.	.7	1.2	1	JAN	1422	143	4.	1.1	2.2	1	JAN	1602	243	33.	1.9	3.7
1	JAN	1243	44	2.	.7	1.2	1	JAN	1423	144	4.	1.2	2.2	1	JAN	1603	244	34.	1.9	3.8
1	JAN	1244	45	2.	.7	1.2	1	JAN	1424	145	4.	1.2	2.2	1	JAN	1604	245	35.	1.9	3.8
1	JAN	1245	46	2.	.7	1.2	1	JAN	1425	146	4.	1.2	2.2	1	JAN	1605	246	35.	1.9	3.8
1	JAN	1246	47	2.	.7	1.2	1	JAN	1426	147	4.	1.2	2.2	1	JAN	1606	247	36.	1.9	3.9
1	JAN	1247	48	2.	.7	1.2	1	JAN	1427	148	4.	1.2	2.3	1	JAN	1607	248	37.	2.0	3.9
1	JAN	1248	49	2.	.7	1.2	1	JAN	1428	149	4.	1.2	2.3	1	JAN	1608	249	38.	2.0	4.0
1	JAN	1249	50	2.	.8	1.2	1	JAN	1429	150	4.	1.2	2.3	1	JAN	1609	250	39.	2.0	4.0
1	JAN	1250	51	2.	.8	1.2	1	JAN	1430	151	4.	1.2	2.3	1	JAN	1610	251	40.	2.0	4.0
1	JAN	1251	52	2.	.8	1.3	1	JAN	1431	152	4.	1.2	2.3	1	JAN	1611	252	41.	2.0	4.1
1	JAN	1252	53	2.	.8	1.3	1	JAN	1432	153	4.	1.2	2.3	1	JAN	1612	253	42.	2.1	4.1
1	JAN	1253	54	2.	.8	1.3	1	JAN	1433	154	4.	1.2	2.3	1	JAN	1613	254	42.	2.1	4.2
1	JAN	1254	55	2.	.8	1.3	1	JAN	1434	155	4.	1.2	2.3	1	JAN	1614	255	43.	2.1	4.2
1	JAN	1255	56	2.	.8	1.3	1	JAN	1435	156	4.	1.2	2.4	1	JAN	1615	256	44.	2.1	4.2
1	JAN	1256	57	2.	.8	1.3	1	JAN	1436	157	4.	1.2	2.4	1	JAN	1616	257	45.	2.1	4.3
1	JAN	1257	58	3.	.8	1.3	1	JAN	1437	158	4.	1.2	2.4	1	JAN	1617	258	45.	2.2	4.3
1	JAN	1258	59	3.	.8	1.3	1	JAN	1438	159	4.	1.2	2.4	1	JAN	1618	259	46.	2.2	4.3
1	JAN	1259	60	3.	.8	1.3	1	JAN	1439	160	4.	1.2	2.4	1	JAN	1619	260	46.	2.2	4.3
1	JAN	1300	61	3.	.8	1.3	1	JAN	1440	161	4.	1.3	2.4	1	JAN	1620	261	46.	2.2	4.3
1	JAN	1301	62	3.	.8	1.4	1	JAN	1441	162	4.	1.3	2.4	1	JAN	1621	262	46.	2.2	4.3
1	JAN	1302	63	3.	.8	1.4	1	JAN	1442	163	4.	1.3	2.5	1	JAN	1622	263	46.	2.2	4.3
1	JAN	1303	64	3.	.8	1.4	1	JAN	1443	164	4.	1.3	2.5	1	JAN	1623	264	46.	2.2	4.3
1	JAN	1304	65	3.	.8	1.4	1	JAN	1444	165	4.	1.3	2.5	1	JAN	1624	265	46.	2.2	4.3
1	JAN	1305	66	3.	.8	1.4	1	JAN	1445	166	4.	1.3	2.5	1	JAN	1625	266	45.	2.2	4.3
1	JAN	1306	67	3.	.8	1.4	1	JAN	1446	167	5.	1.3	2.5	1	JAN	1626	267	45.	2.1	4.3
1	JAN	1307	68	3.	.8	1.4	1	JAN	1447	168	5.	1.3	2.5	1	JAN	1627	268	45.	2.1	4.3
1	JAN	1308	69	3.	.8	1.4	1	JAN	1448	169	5.	1.3	2.5	1	JAN	1628	269	44.	2.1	4.2
1	JAN	1309	70	3.	.8	1.4	1	JAN	1449	170	5.	1.3	2.5	1	JAN	1629	270	44.	2.1	4.2

```
   1 JAN 1310  71       3.       .8     1.4 *  1 JAN 1450 171       5.      1.3     2.6 *  1 JAN 1630 271      43.      2.1     4.2
   1 JAN 1311  72       3.       .8     1.5 *  1 JAN 1451 172       6.      1.3     2.6 *  1 JAN 1631 272      42.      2.1     4.1
   1 JAN 1312  73       3.       .8     1.5 *  1 JAN 1452 173       6.      1.3     2.6 *  1 JAN 1632 273      41.      2.1     4.1
   1 JAN 1313  74       3.       .8     1.5 *  1 JAN 1453 174       6.      1.3     2.6 *  1 JAN 1633 274      40.      2.0     4.1
   1 JAN 1314  75       3.       .9     1.5 *  1 JAN 1454 175       6.      1.3     2.6 *  1 JAN 1634 275      39.      2.0     4.0
   1 JAN 1315  76       3.       .9     1.5 *  1 JAN 1455 176       6.      1.3     2.6 *  1 JAN 1635 276      38.      2.0     4.0
   1 JAN 1316  77       3.       .9     1.5 *  1 JAN 1456 177       6.      1.3     2.6 *  1 JAN 1636 277      38.      2.0     3.9
   1 JAN 1317  78       3.       .9     1.5 *  1 JAN 1457 178       7.      1.4     2.6 *  1 JAN 1637 278      37.      2.0     3.9
   1 JAN 1318  79       3.       .9     1.5 *  1 JAN 1458 179       7.      1.4     2.7 *  1 JAN 1638 279      35.      1.9     3.9
   1 JAN 1319  80       3.       .9     1.5 *  1 JAN 1459 180       7.      1.4     2.7 *  1 JAN 1639 280      34.      1.9     3.8
   1 JAN 1320  81       3.       .9     1.5 *  1 JAN 1500 181       7.      1.4     2.7 *  1 JAN 1640 281      33.      1.9     3.8
   1 JAN 1321  82       3.       .9     1.5 *  1 JAN 1501 182       7.      1.4     2.7 *  1 JAN 1641 282      32.      1.9     3.7
   1 JAN 1322  83       3.       .9     1.6 *  1 JAN 1502 183       7.      1.4     2.7 *  1 JAN 1642 283      31.      1.8     3.6
   1 JAN 1323  84       3.       .9     1.6 *  1 JAN 1503 184       8.      1.4     2.7 *  1 JAN 1643 284      30.      1.8     3.6
   1 JAN 1324  85       3.       .9     1.6 *  1 JAN 1504 185       8.      1.4     2.7 *  1 JAN 1644 285      29.      1.8     3.5
   1 JAN 1325  86       3.       .9     1.6 *  1 JAN 1505 186       8.      1.4     2.7 *  1 JAN 1645 286      28.      1.7     3.5
   1 JAN 1326  87       3.       .9     1.6 *  1 JAN 1506 187       8.      1.4     2.7 *  1 JAN 1646 287      27.      1.7     3.4
   1 JAN 1327  88       3.       .9     1.6 *  1 JAN 1507 188       8.      1.4     2.8 *  1 JAN 1647 288      26.      1.7     3.4
   1 JAN 1328  89       3.       .9     1.6 *  1 JAN 1508 189       9.      1.4     2.8 *  1 JAN 1648 289      25.      1.7     3.3
   1 JAN 1329  90       3.       .9     1.6 *  1 JAN 1509 190       9.      1.4     2.8 *  1 JAN 1649 290      24.      1.7     3.3
   1 JAN 1330  91       3.       .9     1.6 *  1 JAN 1510 191       9.      1.4     2.8 *  1 JAN 1650 291      23.      1.6     3.3
   1 JAN 1331  92       3.       .9     1.6 *  1 JAN 1511 192       9.      1.4     2.8 *  1 JAN 1651 292      22.      1.6     3.2
   1 JAN 1332  93       3.       .9     1.7 *  1 JAN 1512 193      10.      1.4     2.8 *  1 JAN 1652 293      21.      1.6     3.2
   1 JAN 1333  94       3.       .9     1.7 *  1 JAN 1513 194      10.      1.4     2.8 *  1 JAN 1653 294      20.      1.6     3.2
   1 JAN 1334  95       3.       .9     1.7 *  1 JAN 1514 195      10.      1.4     2.8 *  1 JAN 1654 295      19.      1.6     3.1
   1 JAN 1335  96       3.       .9     1.7 *  1 JAN 1515 196      10.      1.4     2.8 *  1 JAN 1655 296      18.      1.6     3.1
   1 JAN 1336  97       3.       .9     1.7 *  1 JAN 1516 197      11.      1.4     2.8 *  1 JAN 1656 297      17.      1.6     3.1
   1 JAN 1337  98       3.       .9     1.7 *  1 JAN 1517 198      11.      1.4     2.8 *  1 JAN 1657 298      17.      1.5     3.1
   1 JAN 1338  99       3.       .9     1.7 *  1 JAN 1518 199      11.      1.5     2.9 *  1 JAN 1658 299      16.      1.5     3.0
   1 JAN 1339 100       3.      1.0     1.7 *  1 JAN 1519 200      11.      1.5     2.9 *  1 JAN 1659 300      15.      1.5     3.0
                                            *                                              *
 ********************************************************************************************************************************************

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR      4.98-HR
+   (CFS)       (HR)
                     (CFS)
+      46.      4.35                 12.         12.         12.          12.
                     (INCHES)     1.228       1.228       1.228        1.228
                      (AC-FT)       5.          5.          5.           5.

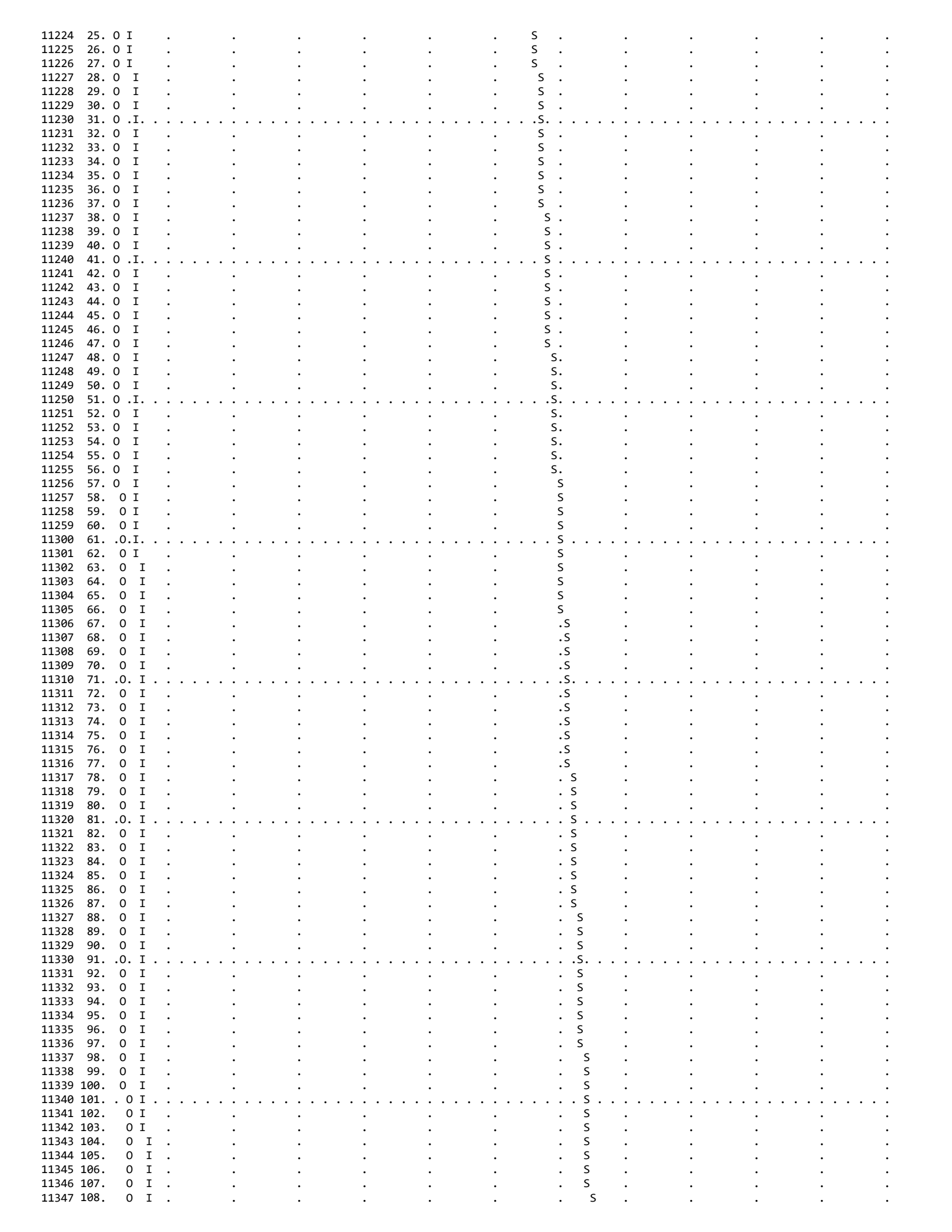
 PEAK STORAGE   TIME                      MAXIMUM AVERAGE STORAGE
                                  6-HR       24-HR       72-HR      4.98-HR
+  (AC-FT)      (HR)
        2.      4.35                 1.          1.          1.           1.

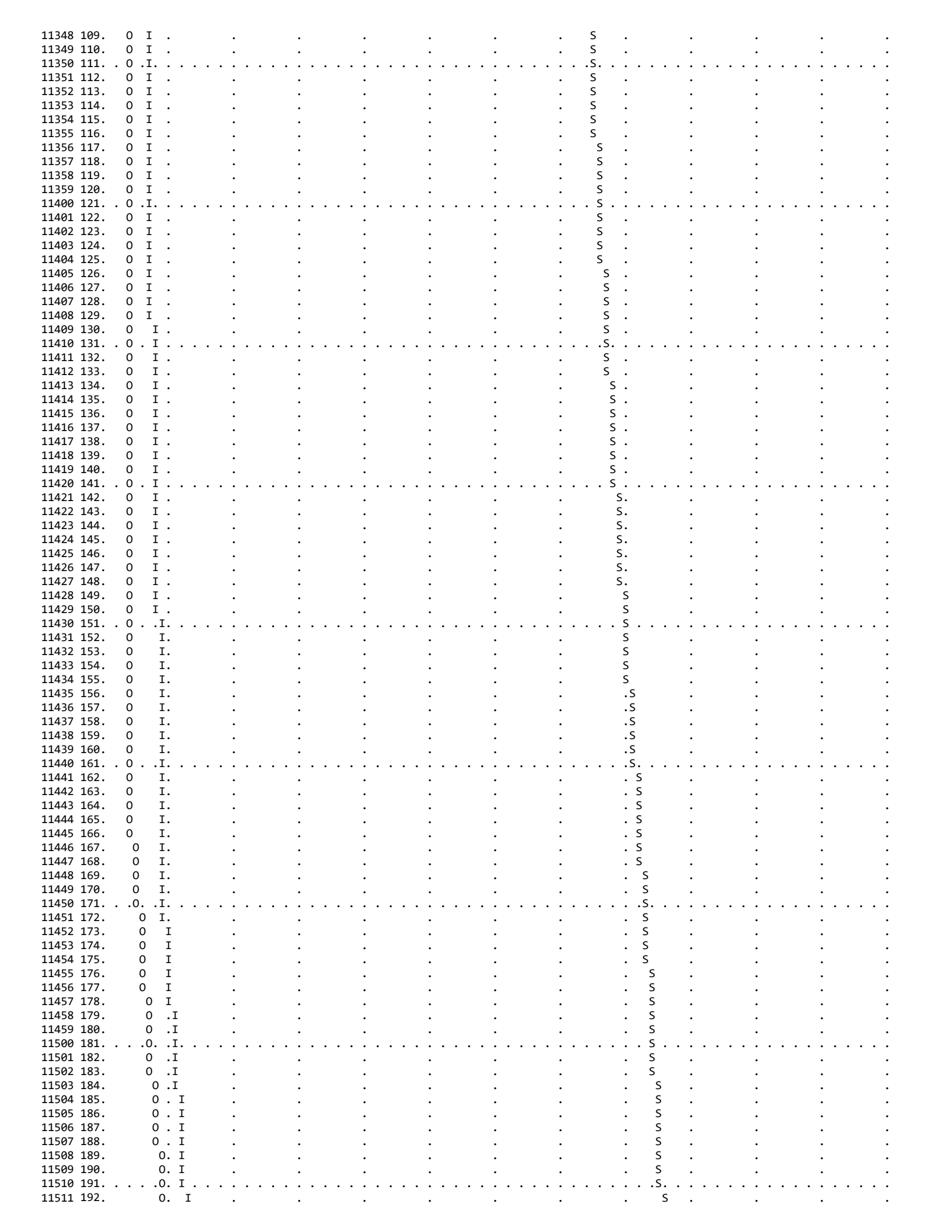
  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                  6-HR       24-HR       72-HR      4.98-HR
+   (FEET)      (HR)
       4.33     4.35                2.38        2.38        2.38         2.38

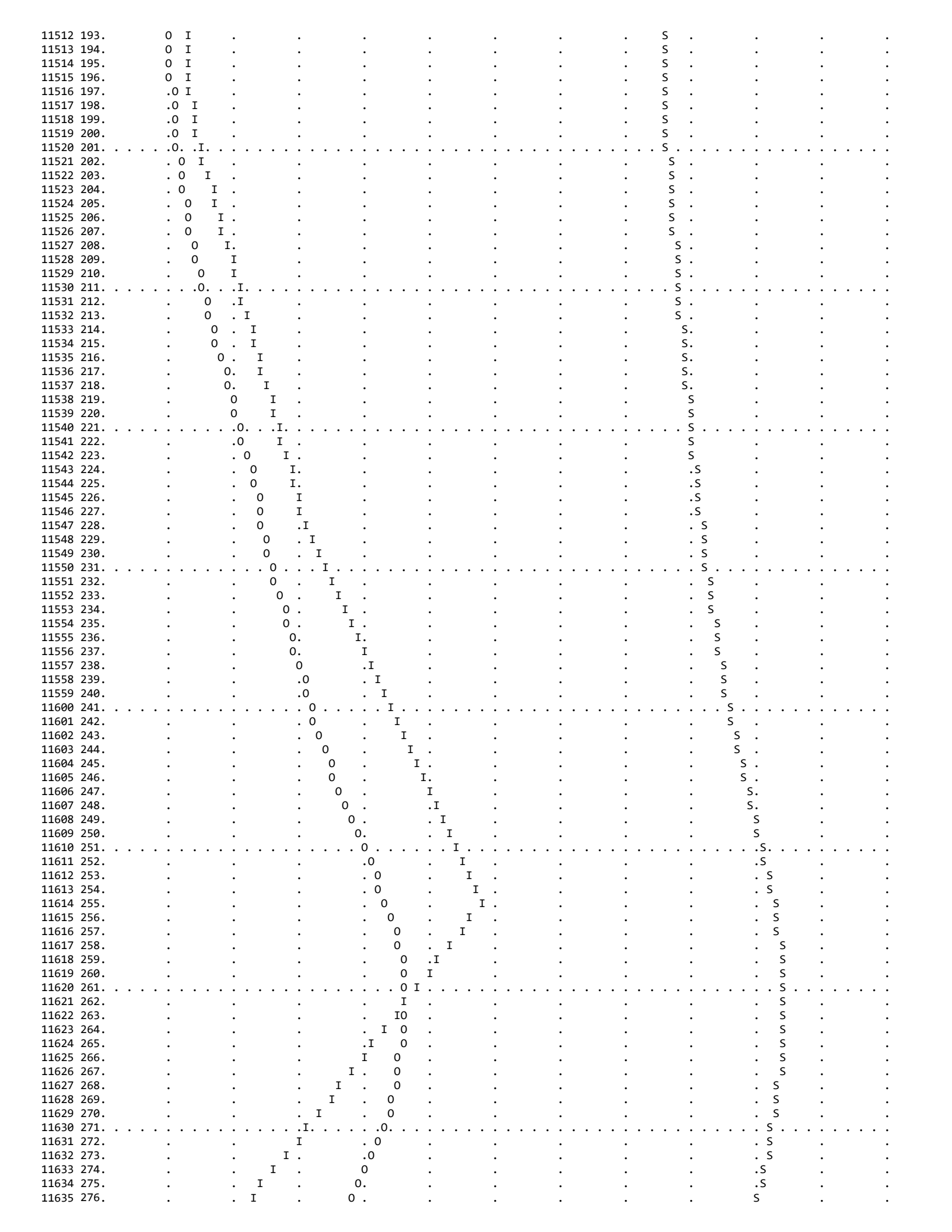
                       CUMULATIVE AREA =     .08 SQ MI

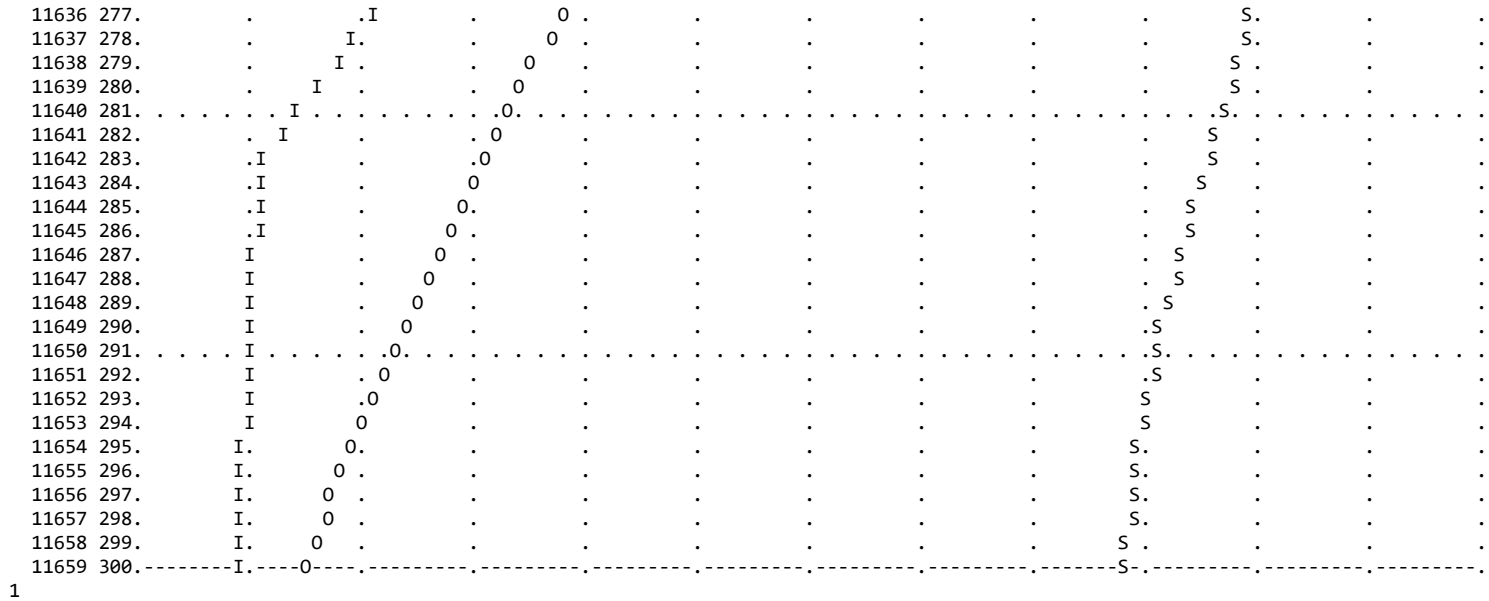
1                                                  STATION     BF14

                      (I) INFLOW,   (O) OUTFLOW
         0.       10.       20.       30.       40.       50.       60.        0.        0.        0.        0.        0.        0.
                                                                                (S) STORAGE
         .0        .0        .0        .0        .0        .0        .4        .8       1.2       1.6       2.0       2.4        .0
 DAHRMN PER
  11200   1I-O-------.---------.---------.---------.---------.---------.-----S---.---------.---------.---------.---------.---------.
  11201   2I O       .         .         .         .         .         .     S   .         .         .         .         .         .
  11202   3I O       .         .         .         .         .         .     S   .         .         .         .         .         .
  11203   4I O       .         .         .         .         .         .     S   .         .         .         .         .         .
  11204   5I O       .         .         .         .         .         .     S   .         .         .         .         .         .
  11205   6.IO       .         .         .         .         .         .     S   .         .         .         .         .         .
  11206   7.IO       .         .         .         .         .         .     S   .         .         .         .         .         .
  11207   8.IO       .         .         .         .         .         .     S   .         .         .         .         .         .
  11208   9.IO       .         .         .         .         .         .     S   .         .         .         .         .         .
  11209  10.IO       .         .         .         .         .         .     S   .         .         .         .         .         .
  11210  11.IO . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11211  12. I       .         .         .         .         .         .     S   .         .         .         .         .         .
  11212  13. I       .         .         .         .         .         .     S   .         .         .         .         .         .
  11213  14. I       .         .         .         .         .         .     S   .         .         .         .         .         .
  11214  15. I       .         .         .         .         .         .     S   .         .         .         .         .         .
  11215  16. I       .         .         .         .         .         .     S   .         .         .         .         .         .
  11216  17. OI      .         .         .         .         .         .     S   .         .         .         .         .         .
  11217  18. OI      .         .         .         .         .         .     S   .         .         .         .         .         .
  11218  19. OI      .         .         .         .         .         .     S   .         .         .         .         .         .
  11219  20. OI      .         .         .         .         .         .     S   .         .         .         .         .         .
  11220  21. OI. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . .
  11221  22. OI      .         .         .         .         .         .     S   .         .         .         .         .         .
  11222  23. O I     .         .         .         .         .         .     S   .         .         .         .         .         .
  11223  24. O I     .         .         .         .         .         .     S   .         .         .         .         .         .
```









1
1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		SWV1495_	58.	4.23	14.	14.	14.	.08		
	ROUTED TO									
+		BF14	46.	4.35	12.	12.	12.	.08		
+									4.33	4.35

*** NORMAL END OF HEC-1 ***

APPENDIX G

FEMA FIRMETTE

NOTES TO USERS

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

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

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

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

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

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

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

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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

Base map information shown on this FIRM was provided in digital format by the USDA National Agriculture Imagery Program (NAIP). this information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated 2009.

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

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

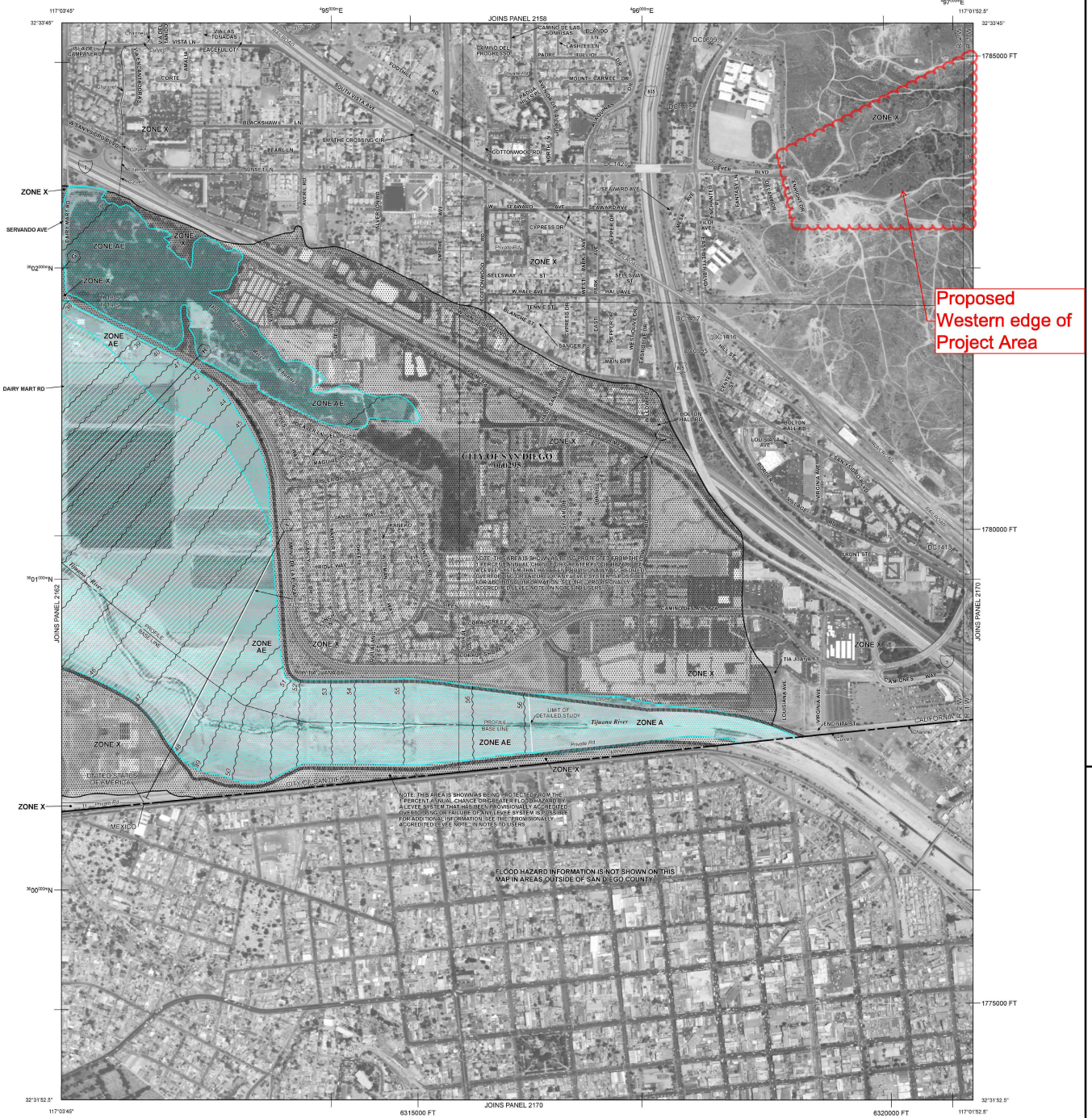
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which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

Contact the **FEMA Map Service Center** at 1-877-FEMA MAP (1-877-336-2627) for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

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

The **"profile base lines"** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Provisionally Accredited Levee Notes to Users: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.10 of the NFIP regulations by July 23, 2009. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicate the levee system does not comply with Section 65.10 requirements, FEMA will revise the flood hazard and risk information for this area to reflect de-accreditation of the levee system. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at http://www.fema.gov/business/nfip/index/.shtm.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 11
- 6000000 FT — 5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 19, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
May 16, 2012 – to update corporate limits, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to update map elevations to North American Vertical Datum of 1988.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2166G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2166 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO, CITY OF	060295	2166	G

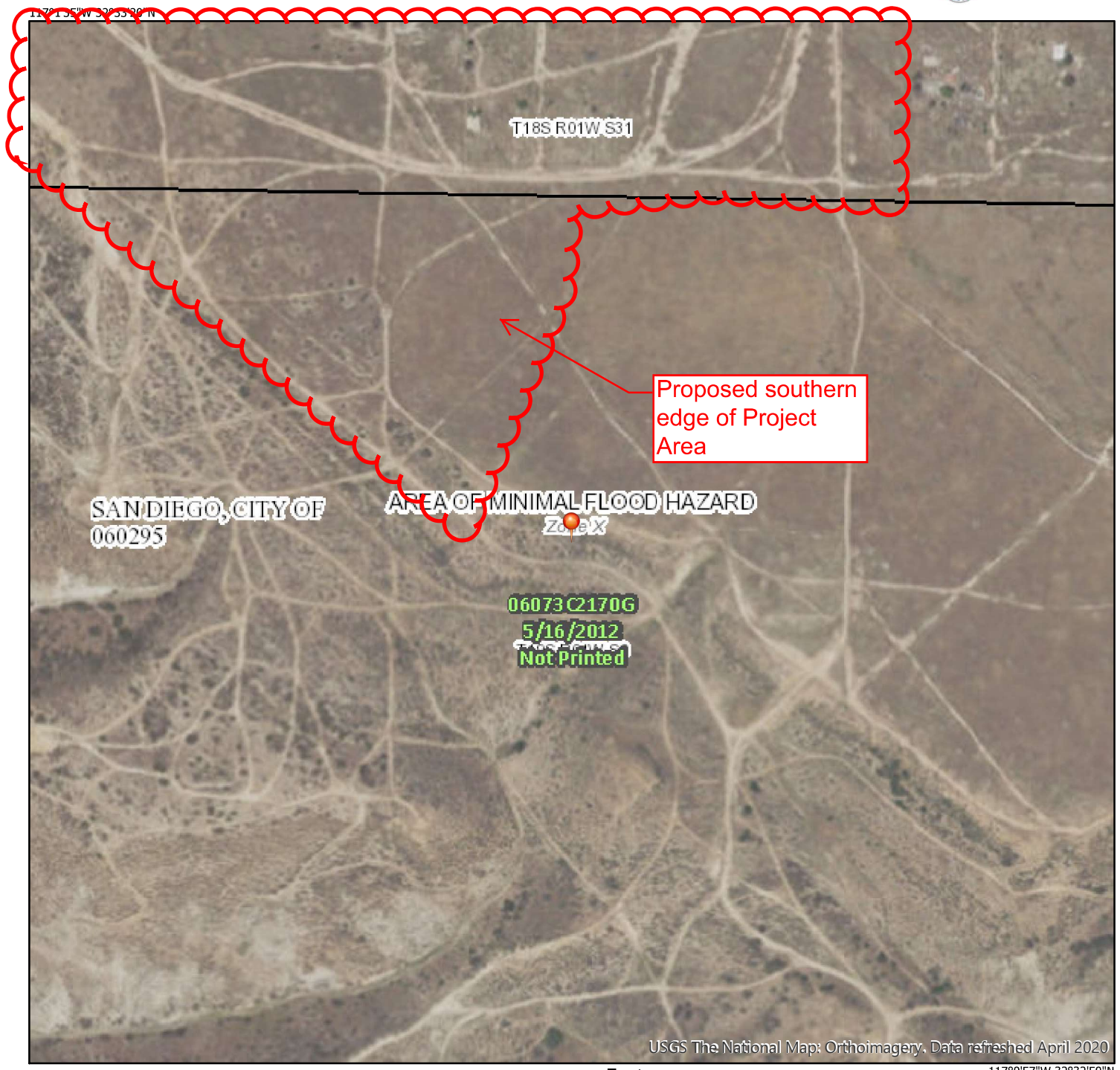
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 06073C2166G

MAP REVISED MAY 16, 2012

Federal Emergency Management Agency

National Flood Hazard Layer FIRMette



0 250 500 1,000 1,500 2,000 Feet

1:6,000

117°0'57"W 32°32'50"N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

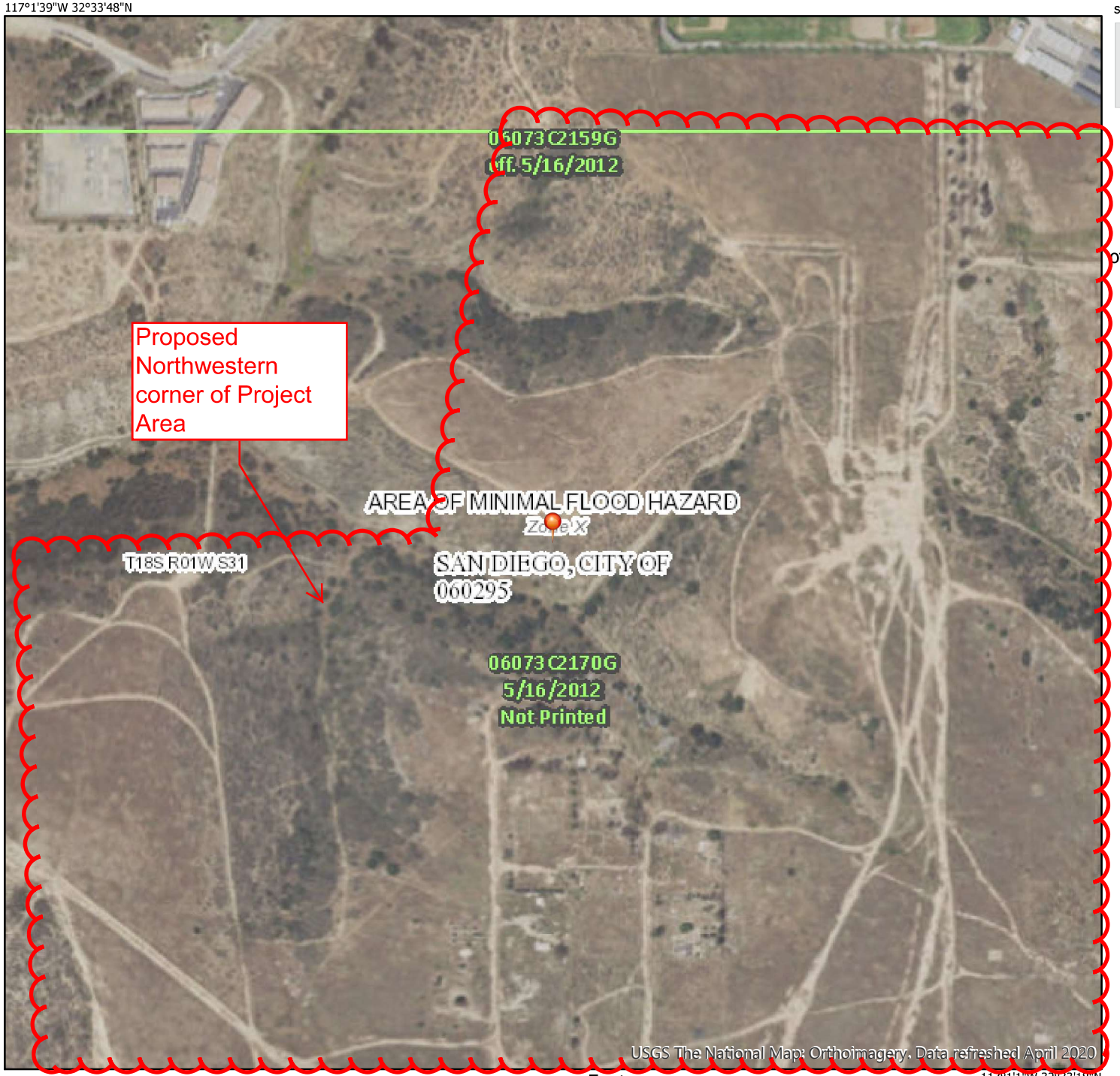
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/10/2020 at 2:40 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

117°1'39"W 32°33'48"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

117°1'1"W 32°33'18"N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
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OTHER AREAS
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GENERAL STRUCTURES
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OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

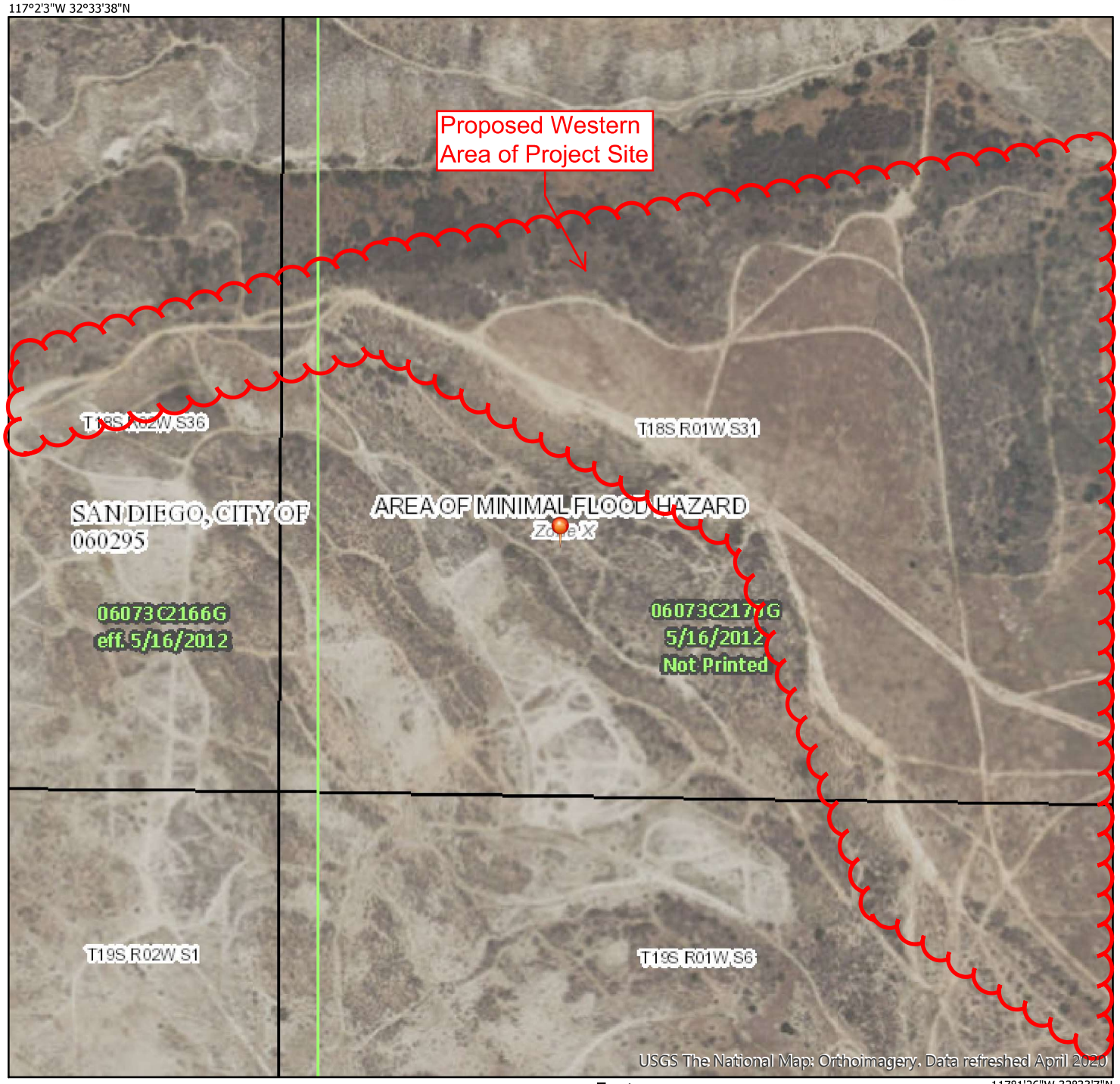
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/10/2020 at 2:50 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
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- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/10/2020 at 2:52 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX H

City of San Diego Meeting Minutes

RICK
ENGINEERING COMPANY

Meeting Minutes

January 28, 2022
City of San Diego
9:00 a.m. – 10:00 a.m.

SUBJECT: 15013C: SOUTHWEST VILLAGE – DRAINAGE DIVERSION AWAY FROM LANDSLIDE AREA

Participants:

City of San Diego:
Thomas Bui (TB) - DSD, Sean Torres (ST) – Discretionary, Eric Mosolgo (EM) – Ministerial
Rick Engineering:
Tim Gabrielson (TG), Brendan Hastie (BH)
TriPointe Homes (TPH) Representatives:
Maykia Vang – Civil Sense – Civil (MV), Wayne Chang – Chang Consultants – Drainage (WC)

ITEMS OF DISCUSSION

- Introductions
- Design History
- Overview of Project Drainage
- Moody Canyon Sub-watershed
- Spring Canyon Sub-watershed
- Action Items

Meeting Minutes:

1. **Design History**

   BH and TG shared the project history includes:
   - Specific Plan
   - VTM, including Technical Reports (Drainage & Detention Study, PDP SWQMP & HMP)
   - The SP and VTM had both been processed with the City for a while (2018 through 2020), and the VTM and Tech Reports were near approval around July 2020, and had incorporated numerous meetings with DSD, SWD Operations, etc, as it pertained to Public vs Private Storm Drain, Outfalls, and WQ/HMP BMPs.
     - Conceptual Drainage & Water Quality Summary for Southwest Village Specific Plan, last revised July 16, 2020
     - DS for South Otay Mesa VTM, last revised 7/16/2020
     - PDP SWQMP for South Otay Mesa VTM, last revised 7/16/2020

2. Drainage Overview

BH shared an overview of the project drainage, including:

- Moody Canyon Sub-watershed – the VTM area mostly drained this direction in the prior design. Beyer Blvd extension runs parallel along Moody Canyon as well.
  - This area discharges to an Existing 54-inch RCP in Beyer Blvd, west of the site.
  - BH - The project would detain back to existing peak flow rates for the 100-year design storm event, to be equal or less than existing conditions.
    - EM – requested that the project take a look at capacity of the immediate downstream existing system, but acknowledged not needing to hydraulically analyze it beyond that.
- Spring Canyon Sub-watershed – the easterly half of the Specific Plan area generally drains east towards Spring Canyon (some through tributaries Dillon Canyon, and Finger Canyon).
  - Spring Canyon terminates at the International Border, entering a large culvert system. The canyon is not visible per aerial imagery on the Mexico side but per topography would head west towards the TJ River, which then enters back into the US.
  - BH – The project would detain back to existing peak flow rates for the 5-year, 10-year, 25-year, 50-year, and 100-year storm events (per the Detention Criteria for flows from City areas to International Border). The project would also control flows for HMP.
  - BH – For TPH, this portion of the Specific Plan area, and future VTM, would discharge through:
    - Outfall #9 - which would be extended down the steep slope to the toe, discharging near the toe of the northern bank of Spring Canyon, just upstream of the Culvert Structure near the border; and
    - Outfall #10 – into the headwaters of Finger Canyon, which goes to Dillon Canyon, then Spring Canyon
- Landslide Area – generally surrounds the west and south of the Specific Plan area.
  - There were numerous Proposed Outfalls towards the Landslide Area, with Existing Drainage Boundaries that drained their direction.
  - The prior design, up through 2020, had paid close attention to mimic drainage areas towards downstream areas (i.e. – minimize diversion), and to also control flow rates and volumes with Detention (100-year), and Hydromodification Management (0.1Q2 through Q10)
  - TG-Recent Geotechnical Borings and explorations of the Landslides for geotechnical characteristics and a groundwater study was performed to model the Landslide slope stability. The recommendations by both the Geotechnical engineer and the groundwater consultant were to not discharge drainage to the landslide slopes as the drainage could infiltrate the landslide through infiltration or enter fissures and cause stability issues with the Landslide area.

- TB- commented that we should coordinate with City staff and our Environmental team for the reduction of drainage to environmental habitat

3. Revised Drainage Approach with Diversion

- The areas that were previously going to discharge across the landslide areas, will now be conveyed either north the Moody Canyon system, or south and east to the Spring Canyon system.
- To "mitigate" the drainage diversion, the project will utilize the proposed underground storage vaults and above ground basin (for Beyer Blvd), to "Detain" back to Pre-project levels, AND, to meet "HMP" requirements back to Pre-development conditions.
  - VTM 1 will be entirely conveyed to the Moody Canyon Subwatershed.
    - The private development areas south of Beyer Blvd will be mitigated with an enlarged Vault and BMP system within the Private Development area, and then discharge into the Public SD system within Beyer Blvd.
    - The public SD system in Beyer Blvd will be mitigated with the above ground Biofiltration Basin, at the western end of the Beyer Blvd Extension.
  - Moody Canyon & Beyer Blvd - There was discussion of several alternatives for how to approach the drainage outfall from the private development area (Basin 300) into Moody Canyon:
    - Alt 1 – required relocated Outfall 3 to be further west, but still outlet down into the CDFW easement area, which would be difficult to access, still require City ownership of the SD, and greater environmental impacts.
      - TB/EM/ST were not in favor of another drainage outfall into a canyon due to long term maintenance and environmental impacts
    - Alt 2 (SELECTED through discussion) – while not typically preferred to commingle private treated/mitigated water with untreated/unmitigated public water, this approach would allow the discharge of the private treated/mitigated runoff into the Beyer SD.
      - The detention and HMP will be modeled in-series and shown that they still collectively mitigate the diversion and meet the HMP criteria for the downstream POC (which for these areas would be considered the 1st open channel downstream of the Ex 54-inch RCP in existing Beyer Blvd, which is TJ River Estuary area, which is known more for sedimentation issues than erosion issues).
      - The WQ flowrates would commingle; however, the onsite private vault would fill and release low flows over time through the Private Compact Biofiltration BMPs, while the Beyer Blvd drainage would route quickly to the Beyer Basin for WQ treatment. The timing considerations, in addition to the unique

constraints of the site related to the Landslide and Environmentally Sensitive Canyon Areas, result in this non-traditional approach being a preferred solution for the various stakeholders.
    - EM/ST agreed in concept that this should be the direction for the project to proceed with and to submit the reports and analysis for review with the Next VTM submittal
- VTM 2 (future VTM) would be located within the area that will drain towards the Spring Canyon Subwatershed. As mentioned above, it would detain back to existing peak flow rates for the 5-year, 10-year, 25-year, 50-year, and 100-year storm events (per the Detention Criteria for flows from City areas to International Border), and also control flows for HMP.
- TB/EM/ST all agreed with the overall revised approach to drainage and the proposed methods and criteria to mitigate for the required diversion.

4. Other Items of Discussion

- ST – asked if the landslide areas would become City Open Space in the future? Suggested P&R be included in the discussion, so they are aware.
    - TG noted P&R has been part of many conversations to date, including coordination on the interface between Beyer Blvd, the Beyer regional stormwater basin, and the Beyer Park being design/constructed by the City (designed by others).
- TB – noted that Environmental Planning should be included in the discussions, made aware of the revised project approach.
- EM – asked about downstream Ex. 54-inch RCP capacity, as noted above.
- EM - asked how the public/private flows will interact for low flows to high flows, and the different timing. BH to discuss in the revised drainage reports
- The Regional Beyer Basin will only be sized to address the Public untreated drainage from the tributary streets (Beyer, Street A, and West Ave), but modeled to account for being in-series from a detention and HMP standpoint.
- Small portions of public streets, similar to the past design and approvals, will enter the private development areas and be treated and detained within the private BMPs.
- Further evaluation of public easements will need to be evaluated for VTM 2 outfall #9 and #10.

5. Recap:

1) RICK to proceed with the proposed diversion related to reducing potential impacts to the Landslide Area, and will document the design approach with the revised Drainage Study (with Detention) and PDP SWQMP (with HMP).
2) RICK will be updating the Specific Plan, VTM, and Tech Reports to resubmit to the City of SD DSD on 3/16/2022.

STATE OF CALIFORNIA
BUSINESS AND TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

I-805-1(82)1

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY

IN SAN DIEGO COUNTY IN AND NEAR SAN DIEGO AND CHULA VISTA
ON ROUTE 805 FROM ROUTE 5 TO 3.2 MILES NORTH OF ROUTE 5 AND
ON ROUTE 75 FROM 0.5 MILE EAST TO 0.3 MILE WEST OF ROUTE 805

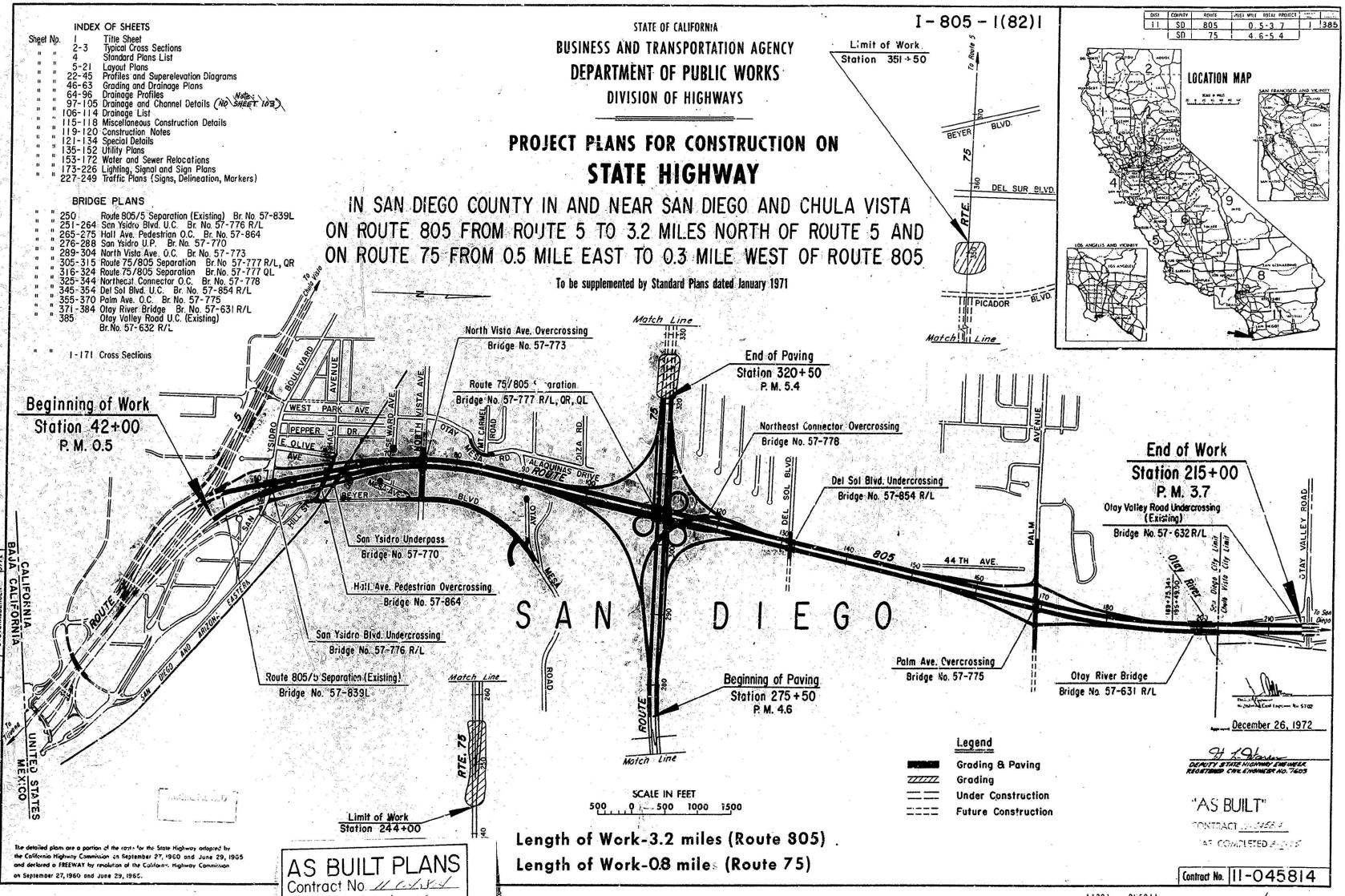
To be supplemented by Standard Plans dated January 1971

INDEX OF SHEETS

Sheet No.		
1		Title Sheet
"	2-3	Typical Cross Sections
"	4	Standard Plans List
"	5-21	Layout Plans
"	22-45	Profiles and Superelevation Diagrams
"	46-63	Grading and Drainage Plans
"	64-96	Drainage Profiles
"	97-105	Drainage and Channel Details (No Sheet 103)
"	106-114	Drainage List
"	115-118	Miscellaneous Construction Details
"	119-120	Construction Notes
"	121-134	Special Details
"	135-152	Utility Plans
"	153-172	Water and Sewer Relocations
"	173-226	Lighting, Signal and Sign Plans
"	227-249	Traffic Plans (Signs, Delineation, Markers)

BRIDGE PLANS

"	250	Route 805/5 Separation (Existing) Br. No. 57-839L
"	251-264	San Ysidro Blvd. U.C. Br. No. 57-776 R/L
"	265-275	Hall Ave. Pedestrian O.C. Br. No. 57-864
"	276-288	San Ysidro U.P. Br. No. 57-770
"	289-304	North Vista Ave. O.C. Br. No. 57-773
"	305-315	Route 75/805 Separation Br. No. 57-777 R/L, QR
"	316-324	Route 75/805 Separation Br. No. 57-777 QL
"	325-344	Northeast Connector O.C. Br. No. 57-778
"	345-354	Del Sol Blvd. U.C. Br. No. 57-854 R/L
"	355-370	Palm Ave. O.C. Br. No. 57-775
"	371-384	Otay River Bridge Br. No. 57-631 R/L
385		Otay Valley Road U.C. (Existing) Br. No. 57-632 R/L
"	"	I-171 Cross Sections



Legend
- Grading & Paving
- Grading
- Under Construction
- Future Construction

Length of Work-3.2 miles (Route 805)
Length of Work-0.8 miles (Route 75)

Approved December 26, 1972

DEPUTY STATE HIGHWAY ENGINEER
REGISTERED CIVIL ENGINEER NO. 7603

"AS BUILT"
CONTRACT ... AS COMPLETED ...

Contract No. 11-045814

Drawn by	Date
Checked by	Date

Design Engineer	Date	Approved Recommended for
T. R. VASQUEZ	3/72	J. D. GRABBERR

Design Engineer	Date	Approved
R. H. CLARK	3/72	

The detailed plans are a portion of the route for the State Highway adopted by the California Highway Commission on September 27, 1960 and June 29, 1965 and declared a FREEWAY by resolution of the California Highway Commission on September 27, 1960 and June 29, 1965.

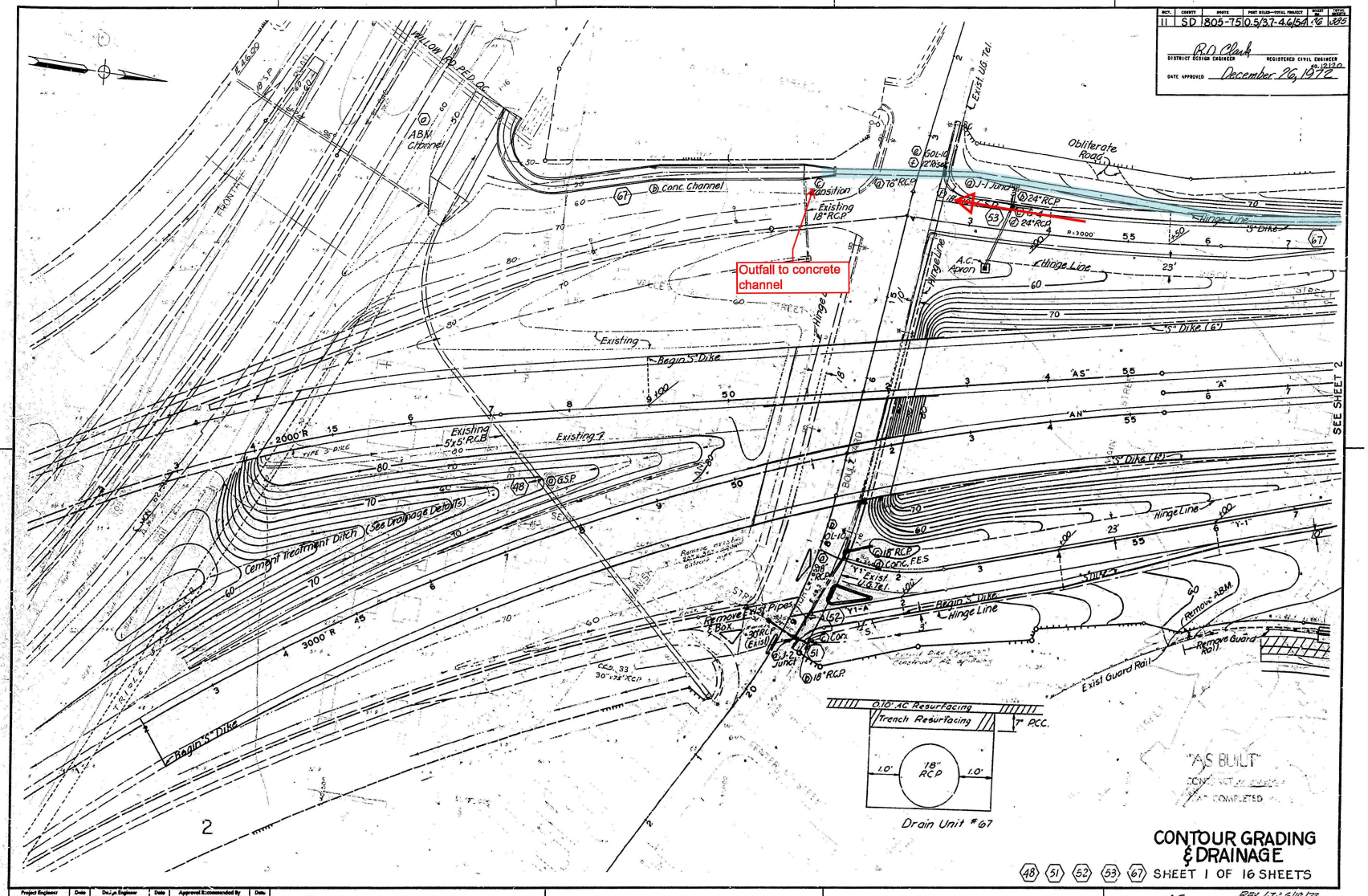
AS BUILT PLANS
Contract No. 11-045814
Date Completed 12-5-72
Document No. 1-045811

11201 045811

I HEREBY CERTIFY that these AS BUILT PLANS are a true and accurate record of the plans and changes made during construction under my direction and control, as the Resident Engineer in charge of the work.

Resident Engineer

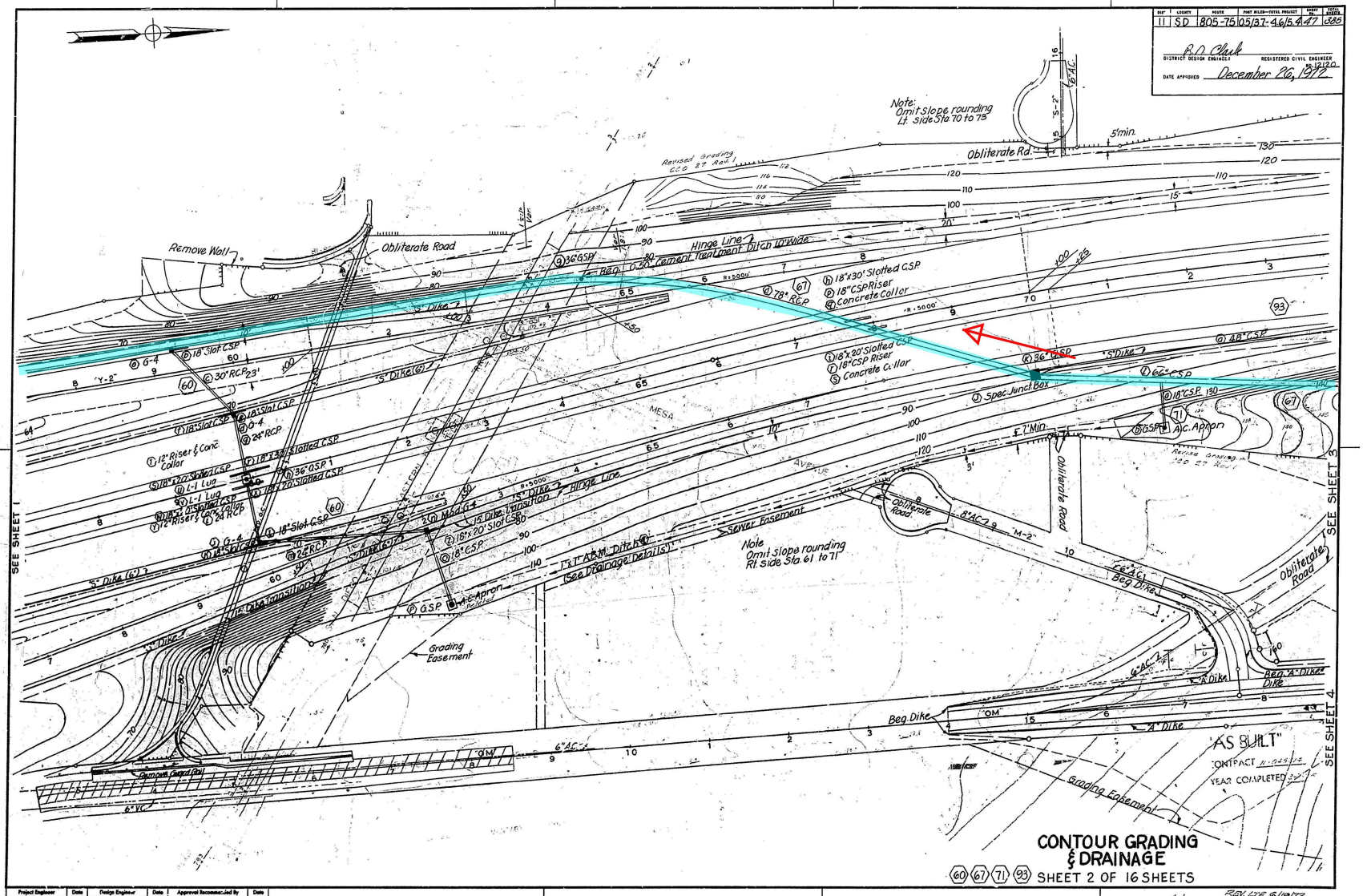




AS BUILT PLANS
Contract No. 11-045401
Date Completed 7-5-75
Document No. 4000621

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

MICROFILMED



Dist	County	Route	Post Mile—Total Project	Sheet	Total Sheets
11	SD	805-75	05/37-46/54.4	47	886

R.D. Clark
DISTRICT DESIGN ENGINEER — REGISTERED CIVIL ENGINEER No. 12120
DATE APPROVED December 26, 1972

Project Engineer	Date	Design Engineer	Date	Approval Recommended By	Date

47 46

REV. LTR. 6/19/72

FORM WH23A-PF

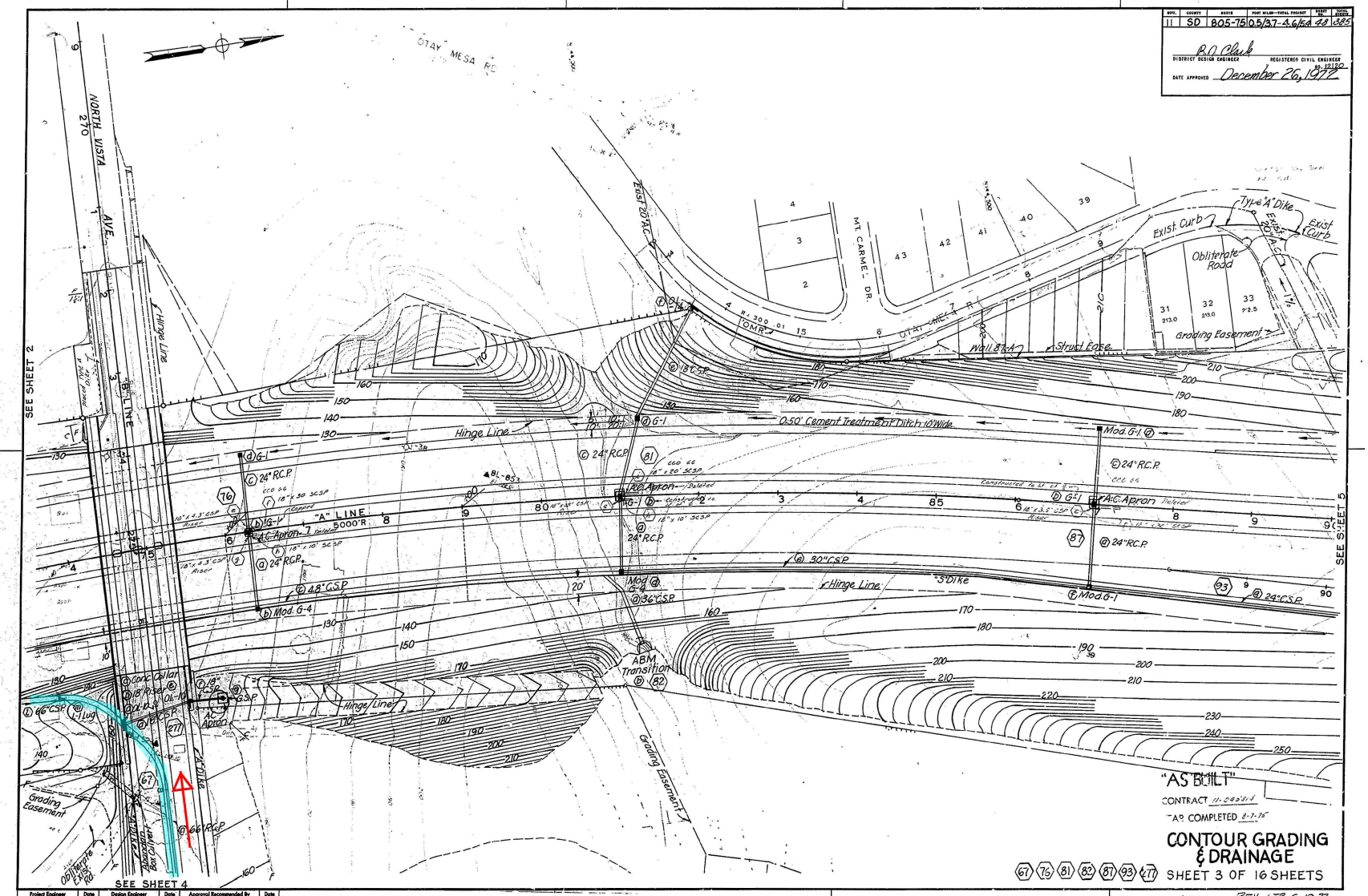
AS BUILT PLANS
Contract No. 11-045814
Date Completed 7-6-72
Document No. 4000681

MICROFILMED JUL 26 1972

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7/26/72 SIGNATURE [signature] TITLE [signature]

SCALE 1"= 50' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1"= 20' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1"= 10' or 1"= 100' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1"= 40' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM



DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	805-75	0.5/3.7-4.6/5.4	40	325

R.O. Clark
DISTRICT DESIGN ENGINEER — REGISTERED CIVIL ENGINEER 11-12120
DATE APPROVED December 26, 1972

"AS BUILT"
CONTRACT 11-045814
TAS COMPLETED 8-7-75

CONTOUR GRADING & DRAINAGE

(67) (76) (81) (82) (87) (93) (77) SHEET 3 OF 16 SHEETS

Project Engineer	Date	Design Engineer	Date	Approval Recommended By	Date

47 REV. LTR. 6-19-72

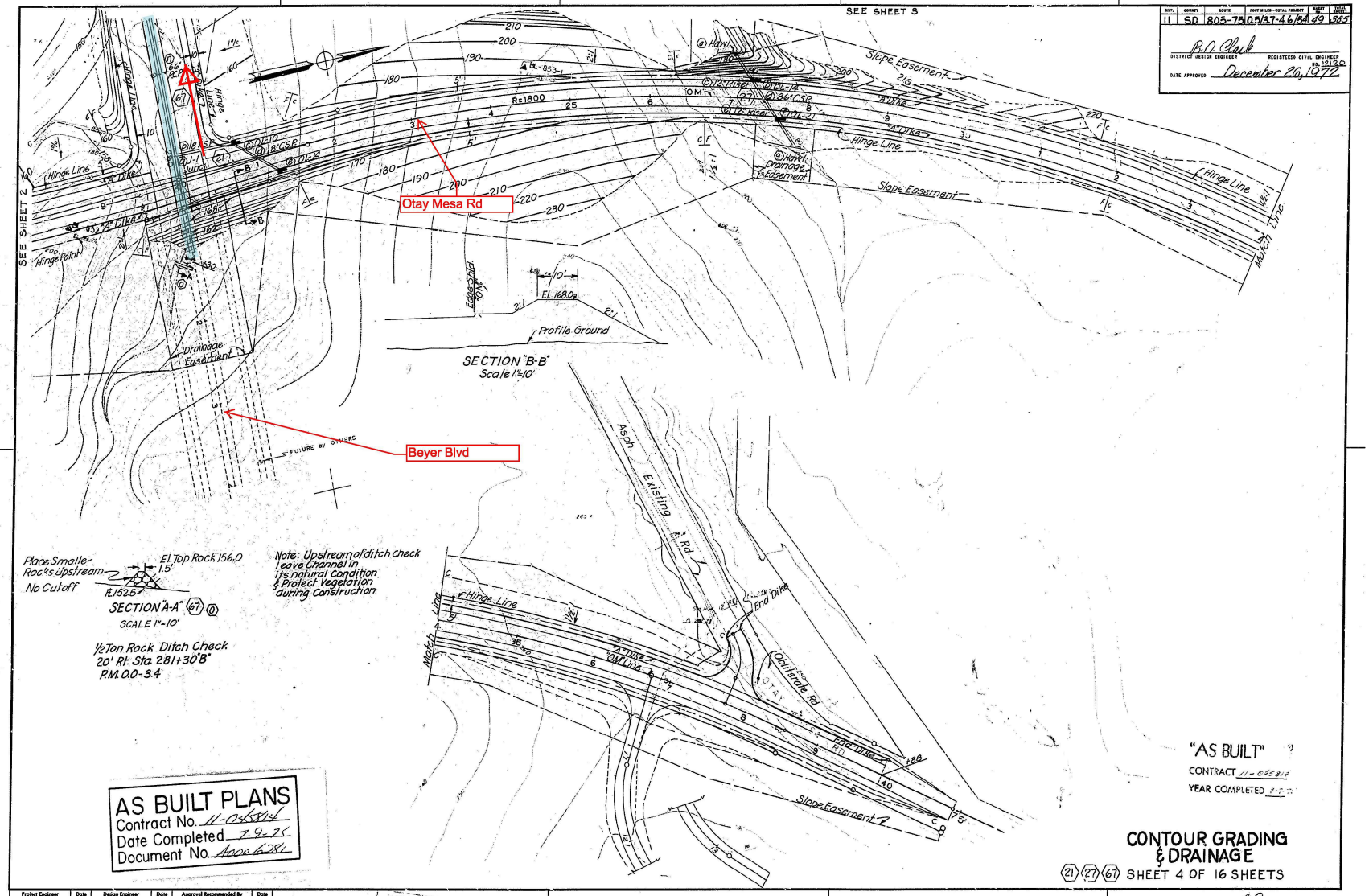
FORM WH23A-PF

AS BUILT PLANS
Contract No. 11-045814
Date Completed 7-9-75
Document No. A0006281

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7/29/76 SIGNATURE [signature] TITLE [illegible]

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM



RTE.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	805-75	0.5/3.7-4.6/5.4	49	385

B. D. Clark
DISTRICT DESIGN ENGINEER — REGISTERED CIVIL ENGINEER NO. 17120
DATE APPROVED December 26, 1972

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 7/26/76 SIGNATURE [illegible] TITLE Microfilm Engineer

FORM WH23A-PF

MICROFILM – STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION – MICROFILM

GENERAL NOTES

1. WHERE NEW UNDERGROUND CONNECTS TO EXISTING WORK IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE LOCATIONS AND ELEVATION OF EXISTING WORK PRIOR TO EXCAVATION FOR NEW WORK AND TO CONNECT THE NEW WORK THERETO.
2. PRIOR TO MIXING WITH CEMENT AND WATER, ALL MINERAL AGGREGATE USED FOR THE PRODUCTION OF CEMENT TREATED BASE SHALL HAVE A SAND EQUIVALENT OF NOT LESS THAN 30, WHEN TESTED BY CALIFORNIA DIVISION OF HIGHWAYS TEST METHOD NUMBER CALIFORNIA 217.
3. CONTRACTORS MAKING ANY TYPE OF EXCAVATION ON THIS PROJECT AFTER ROUGH GRADE AND PRIOR TO FINISH GRADE SHALL REMOVE FROM THE SITE OR TO AREA DESIGNATED BY ENGINEER OF WORK, ALL EXCAVATION MATERIAL EXCEPT THAT USED AS COMPACTED BACKFILL IN SUCH EXCAVATION.
4. THE CONTRACTOR SHALL VERIFY THE LOCATION OF AND PROTECT ALL EXISTING IMPROVEMENTS BEFORE AND DURING CONSTRUCTION.
5. TOP OF STORM DRAIN BOXES SHALL BE CONSTRUCTED CONCURRENT WITH ADJOINING CURBS AND GUTTERS.
6. ALL STRUCTURES IN STREET RIGHT OF WAY SHALL BE KEPT AT LEAST 12" BELOW FINISH GRADE UNTIL CURBS, SIDEWALK AND PAVEMENT ARE INSTALLED AND SHALL THEN BE ADJUSTED TO FINISH GRADE.
7. PROVIDE ADEQUATE PROTECTION - CRASH POST, TYPE "G" CURB - PEDESTAL, FOR FIRE HYDRANTS IN ROLLED CURB AREAS - SEE DETAIL. FLANGE SHALL BE ABOVE PEDESTAL.
8. ENGINEER'S DRAWINGS SHALL BE PROVIDED ON PARTIAL SHEETS BEFORE PAVING BEGINS.
9. ELECTRICAL & TELEPHONE SERVICE FACILITIES SHALL BE INSTALLED UNDERGROUND IN ACCORDANCE WITH SECTION 102.0404 OF THE MUNICIPAL CODE AND SUBDIVISION BOARD RESOLUTION NO. 264
   THERE ARE EXISTING 12 KVA OVERHEAD LINES ALONG WESTERN EDGE THIS SUBDIVISION TO BE UNDERGROUNDED.
10. ALL UNDERGROUND UTILITIES & LATERALS TO BE INSTALLED BEFORE CONSTRUCTION OF CURBS OR CONCRETE
11. CROSS-GUTTERS OR SURFACING OF STREETS.
    CONTRACTOR SHALL VERIFY LOCATIONS OF DRIVEWAYS AND SHALL CONSTRUCT DRIVEWAY DEPRESSION CONCURRENT WITH CURB CONSTRUCTION FOR EACH LOT. STANDARD DRAWING NUMBERS G-14, G-16, G-15

WATER AND SEWER NOTES

1. THE WATER AND SEWER FACILITIES SHOWN ON THESE PLANS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE WATER UTILITIES DIRECTOR.
2. EACH BUILDING SHALL RECEIVE A 1-INCH WATER SERVICE AND 4-INCH SEWER HOUSE CONNECTION. LOCATION TO BE DETERMINED IN THE FIELD BY THE ENGINEER OF WORK. THE "AS BUILT" LOCATIONS SHALL BE SHOWN ON THESE PLANS AND THE SEWER LATERAL TABLE COMPLETED PRIOR TO ACCEPTANCE OF THE WATER AND SEWER FACILITIES.
3. WATER SERVICES, SEWER LATERALS AND FIRE HYDRANT SERVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE STANDARD DRAWINGS. THE LOCATION OF WATER AND SEWER FACILITIES SHOWN ON THESE PLANS SHALL TAKE PRECEDENCE IN CASE OF CONFLICTS WITH OTHER UTILITIES NOT SHOWN HEREON.
4. SUBSTITUTION OF MATERIALS FOR CONSTRUCTION OF WATER AND SEWER FACILITIES WILL NOT BE ALLOWED UNLESS APPROVED BY THE WATER UTILITIES DIRECTOR.
5. LOCATE WATER SERVICES AND SEWER HOUSE CONNECTIONS OUT OF DRIVEWAYS. THE SEWER HOUSE CONNECTION SHALL BE A MINIMUM 5' DISTANCE DOWNSTREAM FROM THE WATER SERVICE.
6. WHERE SEWER LATERALS CROSS THE CURB LINE, A LETTER "S" SHALL BE STAMPED OR CHISELED IN THE CURB FACE (1-1/2-INCHES HIGH AND 3/16-INCHES DEEP).
7. COVER OVER WATER MAIN IS TO BE 3' UNLESS OTHER IS CALLED OUT. IF OVER 5' OF COVER AND LESS THAN 2.5', A.C. MAIN IS NOT ACCEPTABLE.
8. SEWER LATERALS ARE TO BE SPACED SO THERE IS ONLY ONE CONNECTION IN ANY ONE PIPE LENGTH. DOUBLE WYES ARE NOT TO BE USED.
9. OPEN ENDS OF ALL SEWER MAINS AND SEWER LATERALS SHALL BE PLUGGED WITH PVC PLUGS.
10. ALL LATERALS WITH LESS THAN 4-FOOT COVER TO INVERT BE CONCRETE ENCASED.
11. ALL SEWER MAINS AND LATERALS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT SEWER AGENCY AND STREET AGENCY STANDARDS FOR SEWER CONSTRUCTION AND SAID STANDARDS WILL GOVERN ALL SEWER TRENCH BACKFILL.
12. SUBSTITUTION OF MATERIALS FOR CONSTRUCTION OF WATER AND SEWER FACILITIES SHALL NOT BE ALLOWED UNLESS APPROVED BY THE WATER UTILITIES DIRECTOR.
13. ALL WATER MAINS SHALL BE CLASS 150 UNLESS OTHERWISE NOTED.
14. ALL MANHOLE COVERS, GATE VALVE COVERS AND STREET MONUMENTS SHALL BE ADJUSTED TO FINISH GRADE. (NEW OR EXISTING).
15. PRESSURE REGULATORS REQUIRED ON WATER SERVICES.
16. BYPASS REQUIRED ON 12" AND 16" GATE VALVES.

TELEPHONE, GAS & ELECTRIC NOTES

1. NOTICE: ALL TELEPHONE SERVICES WITH THIS SUBDIVISION ARE "UNDERGROUND INSTALLATION". FOR LOCATION OF CABLES AND APPURTENANCES CONTACT THE PACIFIC TELEPHONE & TELEGRAPH CO.
2. NOTICE: ALL ELECTRICAL AND GAS SERVICES WITHIN THIS SUBDIVISION ARE "UNDERGROUND INSTALLATION". FOR LOCATION OF ELECTRICAL CABLES AND GAS PIPING AND APPURTENANCES, CONTACT SAN DIEGO GAS & ELECTRIC COMPANY.

STREET LIGHT NOTES

1. CONTRACTOR INSTALLING THE STREET LIGHTING DISTRIBUTION SYSTEM SHALL NOTIFY FIELD ENGINEER, , PHONE 236-5520 A MINIMUM OF 3 DAYS BEFORE BEGINNING OF WORK FOR APPROVAL OF CONDUIT LOCATION AND REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL STREET LIGHTS ARE BURNING AND NOTIFY FIELD ENGINEER, , PHONE 236-5520 A MINIMUM OF 4 WEEKS AFTER FINAL ELECTRICAL INSPECTION.

8 — 9500 LUMEN 100 WATT TYPE III HIGH PRESSURE SODIUM VAPOR WITH CUTOFF FIXTURE
3 — 16000 LUMEN 150 WATT TYPE III HIGH PRESSURE SODIUM VAPOR WITH CUTOFF FIXTURE AND TYPE IV STEEL STANDARD

SOILS REPORT

WILLIAM S. KROOSKOS & ASSOCIATES
REPORT DATED JULY 21, 1977
PROJECT NO. 77-5343

STORM DRAIN ALTERNATES

ALTERNATE NO.1: ASBESTOS CEMENT DRAIN PIPE, SPECIAL PROVISION P-21 SHALL GOVERN. (A.C.P. SHALL BE 2000-D)

ALTERNATE NO.2 CAST IN PLACE CONCRETE PIPE, SPECIAL PROVISION P-16 SHALL GOVERN.

REFERENCE DRAWINGS

OTAY MESA SEWER AND SAN YSIDRO SCHOOL DISTRICT WATER MAIN DWGS: 16864-1-D, 16864-2-D, AND 16864-3-D.

WATER CONNECTIONS

CONNECTION NO. 1 - $2000.00

SITE DEVELOPMENT

GRADING - SHEETS 9 & 10
LANDSCAPING - SHEETS 9 & 11
IRRIGATION - SHEETS 9 & 11
EXCAVATION = 24,500 C.Y.
EMBANKMENT = 150,000 C.Y.
(IMPORT) = 125,500 C.Y.

WORK TO BE DONE

The Improvements consist of the following work to be done according to these plans and the Specifications and Standard Drawings of the City of San Diego.

SPECIFICATIONS

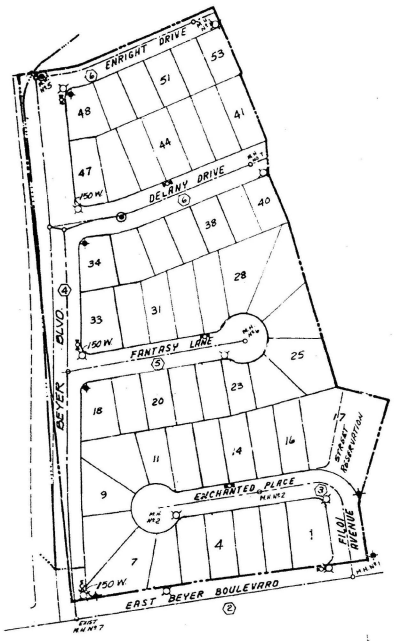
(1) Green Book Standard Specifications (1976 Ed.) Document No. 755163 filed May 10, 1976, and
(2) City of San Diego Standard Special Provisions, Document No. 758403, filed February 25, 1977.

STANDARD DRAWINGS

(1) City of San Diego Standard Drawings (1977 Ed.) Document No. 758672 filed March 21, 1977, and
(2) ( )* Denotes City of San Diego Standard Drawing per Document No. 735691, filed April 26, 1971.

IMPROVEMENTS	STD. DWG. NO.	SYMBOL
A.C. PAVEMENT	(G-58)*(G-59-7)*	
TYPE "G" CURB	G-2	
PAVEMENT CUTOFF WALL	G-22	
CROSS GUTTER	G-12	
SIDEWALK	G-7	
PEDESTRIAN RAMP	SD G-101	
A.C. BERM	G-5	6" B-1
CONTROL MONUMENT (3)	(M-21-7)*	
DRIVEWAY	G-14	
2" A.C.		
SEWER MAIN (JOHNS-MANVILLE)	S-4, S-5	8" P.V.C.
SEWER CONCRETE MANHOLE	S-1, M-3 (SEE DETAIL SHT)	M.H.
4" P.V.C. SEWER HOUSE CONNECTION	S-13	
CONCRETE CRADLE FOR SEWERS	S-6	
CUT OFF WALL	S-10	
WATER MAIN (TYLER FITTINGS JOHNS-MANVILLE)	W 21, W-17, W-18, W-20	8" A.C.
1" COPPER WATER SERVICE	(W-2)*, W-15.42, (W-27)*	
GATE VALVE AND BOX W/BYPASS 12" & 16" G.V. (GATE VALVE COVER ONLY)	SDW 102, W-19-A, W-12-B, (W-26)*, I-27	8" G.V.
FIRE HYDRANT ASSEMBLY	W-10, W-11-A	F.H.
BLOW-OFF ASSEMBLY	SDW-102	B.O.
MULTI SERVICE FITTING	(W-60)*	
2" AIR VALVE	(W-19)*	2" A.V.
STORM DRAIN	D-60	
CURB INLET TYPE B, B-1	D-2	
GRAVITY HEADWALL	D-32	
STORM DRAIN CLEAN OUT	D-9, D-10	
CONCRETE LUG	D-63	
WING TYPE HEADWALL	D-35	
CURB OUTLET A & B	D-25	
STREET NAME SIGN	SDM-102, SDM-103	
STREET LIGHT SYSTEM	E-1, E-2, E-4	
BARRICADES AND GUARD POST	M-9	

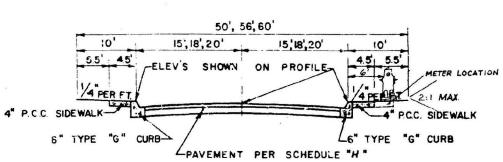
MAINTAINING TRAFFIC. THE CONTRACTOR SHALL MAINTAIN ONE LANE OF TRAFFIC IN EACH DIRECTION DURING WORKING HOURS OF 8:30 AM TO 3:30 PM AND SHALL MAINTAIN FULL WIDTH OF TRAVEL LANES OF EXISTING ROADWAY DURING THE HOURS OF 3:30 PM AND 8:30 AM, ON SATURDAY, SUNDAY, AND DESIGNATED LEGAL HOLIDAYS, AND WHEN CONSTRUCTION OPERATIONS ARE NOT ACTIVELY IN PROGRESS ON WORKING DAYS THE CONTRACTOR SHALL MAINTAIN ALL TRAVEL LANES OF THE ROADWAY. ANY DEVIATION OF THESE REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 7-10.3 OF THE STANDARD SPECIFICATIONS.



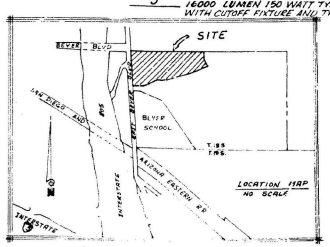
SCALE 1" = 100'

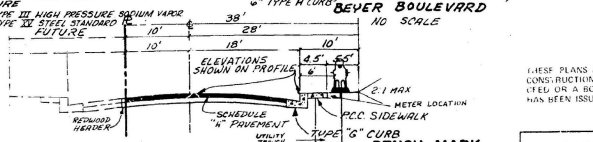
		ADT	
⊕ INDICATES CONTROL MONUMENTS	BEYER BOULEVARD	20,000	{6" A.C. ON 10 1/2" C.T.B.
▪ INDICATES STREET NAME SIGN	EAST BEYER BOULEVARD	10,000	{4" A.C. ON 10 1/2" C.T.B.
FCH INDICATES FIRE HYDRANT	ENCHANTED PLACE	CUL-DE-SAC	{2" A.C. ON 6" C.T.B.
⊠ INDICATES STREET LIGHT SYSTEM	FANTASY LANE	CUL-DE-SAC	{2" A.C. ON 6" C.T.B.
INDICATES SEWER MAIN & MANHOLE	FILIO AVENUE	CUL-DE-SAC	{2" A.C. ON 6" C.T.B.
② INDICATES IMPROVEMENT PLAN SHEET NO.	ENRIGHT DRIVE	LOCAL	{2" A.C. ON 6" C.T.B.
INDICATES STORM DRAIN	DELANY DRIVE	2,000	{2" A.C. ON 6" C.T.B.

KEY MAP SYMBOLS



ALL INTERIOR TYPICAL STREET SECTION (NOT TO SCALE)

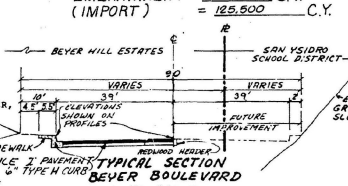




TYPICAL SECTION BOUNDARY ENRIGHT DRIVE NO SCALE



TYPICAL SECTION EAST BEYER BLVD. NO SCALE



TYPICAL SECTION BEYER BOULEVARD NO SCALE

BENCH MARK

CITY OF SAN DIEGO BENCH MARK SW COR BRIDGE UP FLATS "BRASS PLUG IN BEYER HILL ESTATES" 1977 DATUM ADJUSTMENT N-1775, E-17557 ELEV. = 144.053

"AS BUILT"
DATE:

THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION UNTIL THE NOTICE TO PROCEED OR A BONDED SUBDIVISION PERMIT HAS BEEN ISSUED BY THE CITY ENGINEER.

PRIVATE CONTRACT
ENGINEER OF WORK
ASSOCIATED ENGINEERS
3904 GROTON STREET
SAN DIEGO, CALIF. 92110
PHONE (714) 224-2467
Jon Pannell RCE 35900
DATE 20 SEPT 1978

PLANS FOR THE PUBLIC IMPROVEMENTS IN AND ADJOINING
BEYER HILL ESTATES
CITY OF SAN DIEGO, CALIFORNIA
SHEET 1 OF 11 SHEETS
T.M. 77-219
M.S. NO. 70772

C.T. Incl. Mod. 12-4-78 — Jim Mueller 12-6-78

DESCRIPTION	BY	APPROVED	DATE	FILED
ORIGINAL				
AS BUILT				

CONTROL 142-1755
BENCH MARK
CONTRACTOR GEN. HALL — DATE STARTED 3-16-79
INSPECTOR CE "ERA" STATE — DATE COMPLETED 12-28-82
17793-1-D

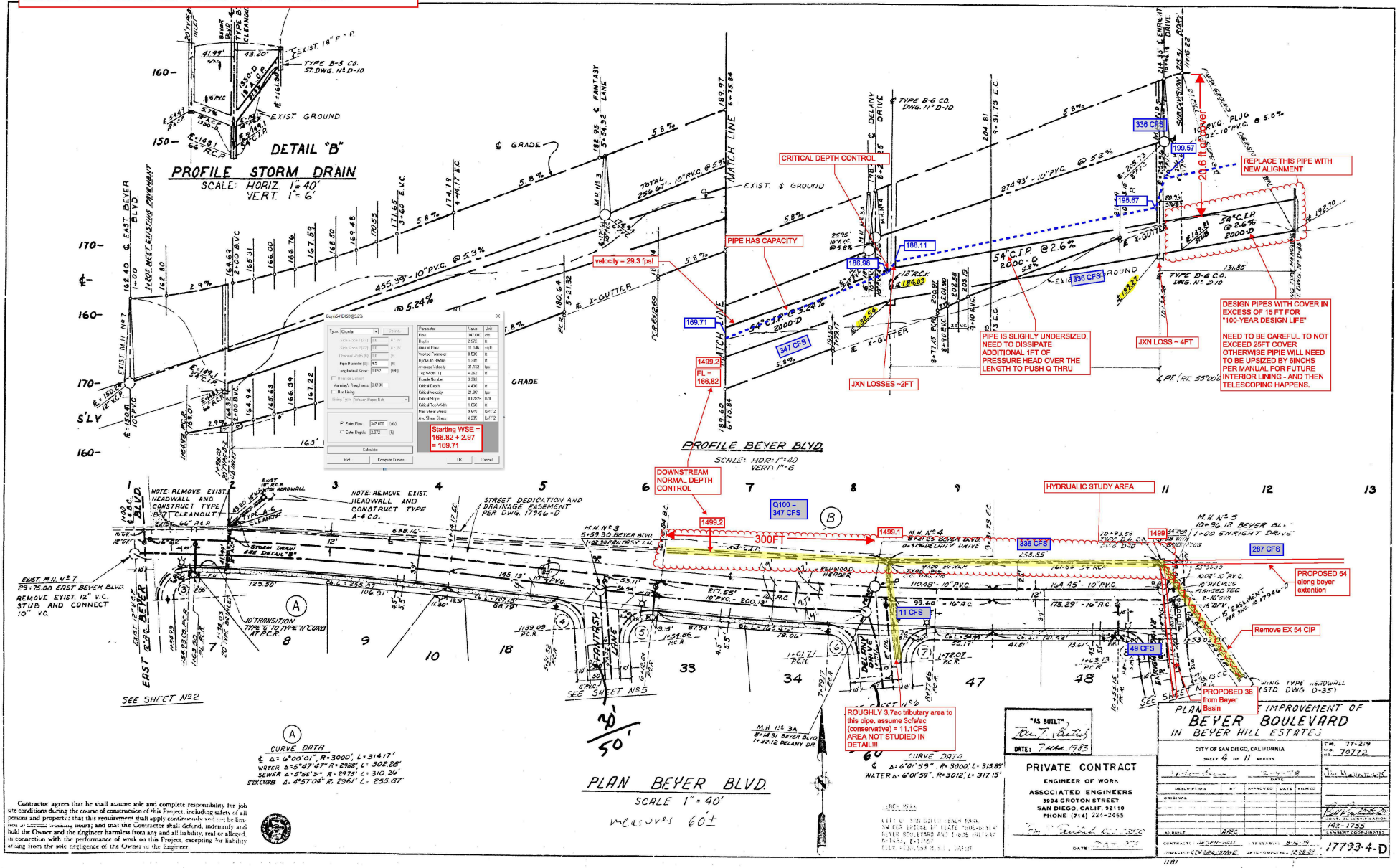
1131

0 1 2 3 4 IN.

DATUM IS BELIEVED TO BE NGVD29. PLANS DATE = 1979

ALL ELEVATIONS ON THIS SHEET (CALCULATED AND ORIGINAL) ARE IN NGVD29

ELEVATIONS TO BE SHIFTED UPWARDS 2.3 FT FOR NAVD88



Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this Project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this Project, excepting for liability arising from the sole negligence of the Owner or the Engineer.

APPENDIX I

Moody Canyon Hydraulic Calculations

PROPOSED CULVERT BEYER BLVD

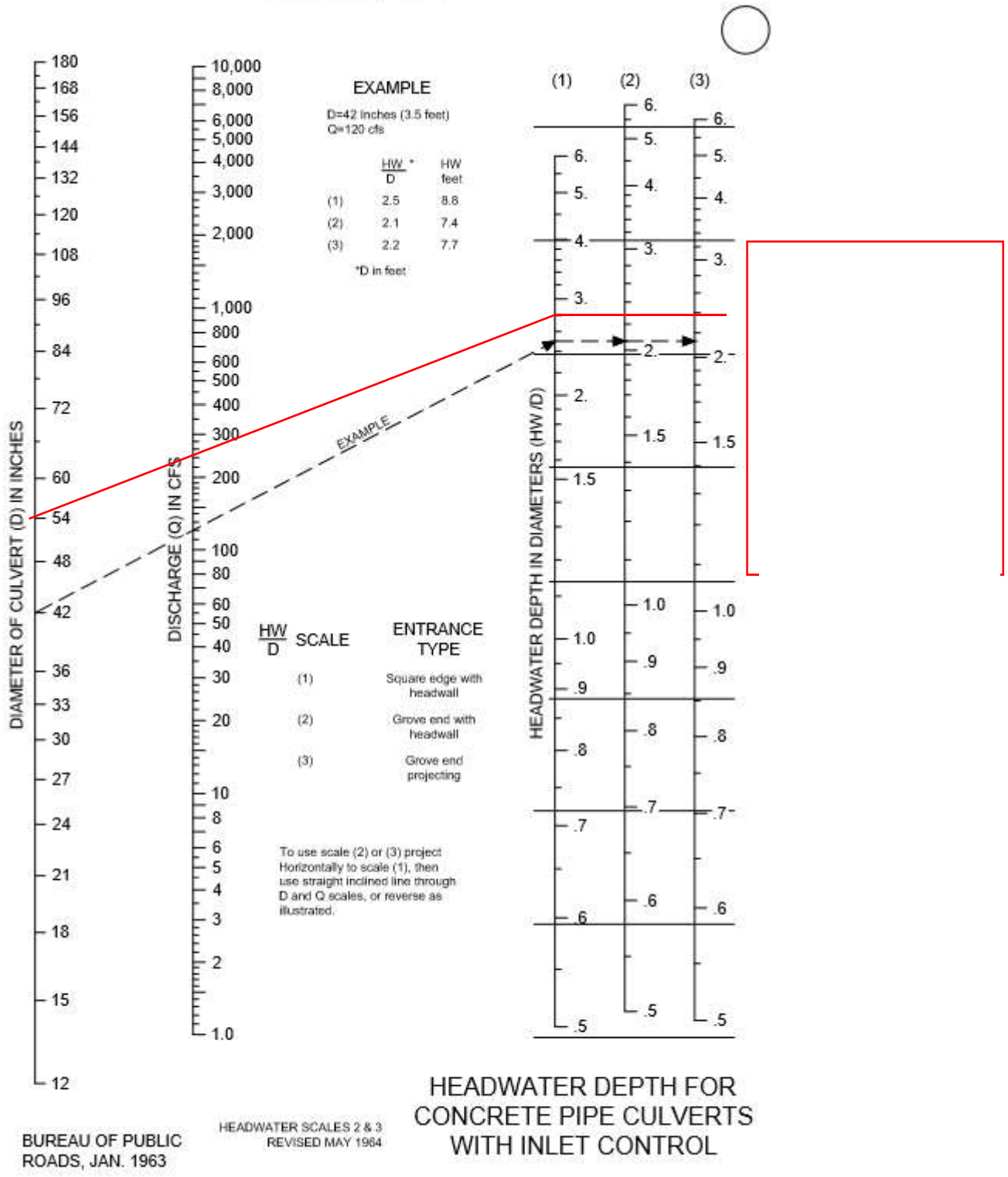


Figure E-1. Circular Culvert Nomograph (Chart 1B)

Hydraulic Analysis Report

Elevation (ft)	Elevation (ft)	Manning's n
100.00	100.00	0.0300
128.71	95.00	0.0300
148.60	90.00	0.0300
150.98	89.00	0.0300
164.25	90.00	0.0300
178.52	95.00	0.0300
197.10	100.00	-----

Project Data

Project Title: 15013C Southwest Village

Designer: EJS

Project Date: Thursday, December 15, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: CROSS SECTION 1420-1430

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Longitudinal Slope: 0.0400 ft/ft

Flow: 257.3000 cfs

Result Parameters

Depth: 1.8873 ft

Area of Flow: 24.3962 ft^2

Wetted Perimeter: 22.2095 ft

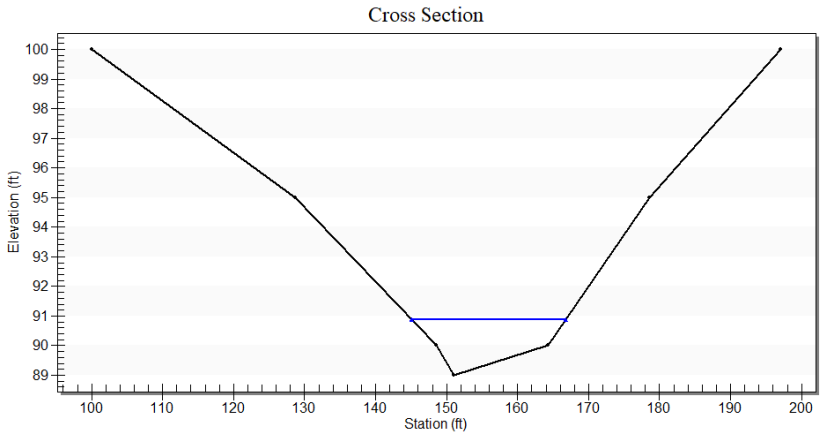
Hydraulic Radius: 1.0985 ft

Average Velocity: 10.5467 ft/s

Top Width: 21.7091 ft

Froude Number: 1.7533

Critical Depth: 2.4392 ft



Critical Velocity: 6.8765 ft/s

Critical Slope: 0.0119 ft/ft

Elevation (ft)	Elevation (ft)	Manning's n
100.00	100.00	0.0300
131.10	95.00	0.0300
167.81	90.00	0.0300
175.17	88.00	0.0300
194.73	90.00	0.0300
203.81	94.00	0.0300
221.48	95.00	0.0300
247.29	100.00	-----

Critical Top Width: 25.48 ft

Calculated Max Shear Stress: 4.7108 lb/ft^2

Calculated Avg Shear Stress: 2.7418 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0300

Channel Analysis: CROSS SECTION 1410-1420

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Longitudinal Slope: 0.0400 ft/ft

Flow: 211.3900 cfs

Result Parameters

Depth: 1.8393 ft

Area of Flow: 22.7689 ft^2

Wetted Perimeter: 25.0970 ft

Hydraulic Radius: 0.9072 ft

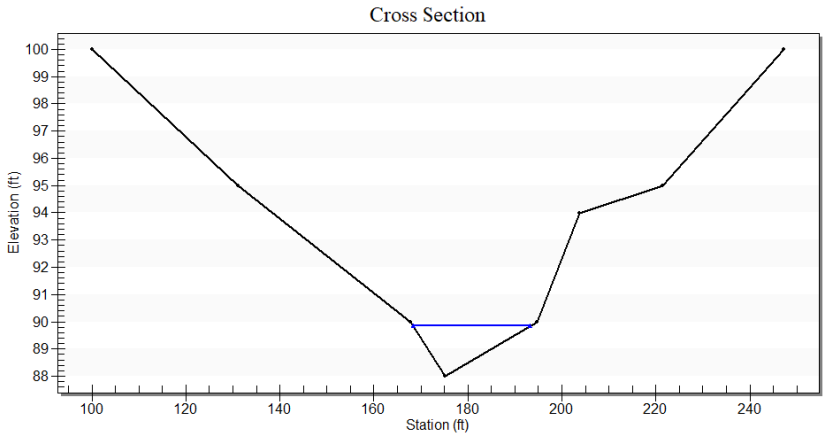
Average Velocity: 9.2841 ft/s

Top Width: 24.7576 ft

Froude Number: 1.7061

Critical Depth: 2.2673 ft

Critical Velocity: 6.1344 ft/s



Critical Slope: 0.0127 ft/ft

Critical Top Width: 29.49 ft

Elevation (ft)	Elevation (ft)	Manning's n
100.00	100.00	0.0300
117.26	95.00	0.0300
135.66	90.00	0.0300
154.56	86.00	0.0300
206.33	86.00	0.0300
237.35	90.00	0.0300
262.64	95.00	0.0300
290.64	100.00	-----

Calculated Max Shear Stress: 4.5910 lb/ft^2

Calculated Avg Shear Stress: 2.2645 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0300

Channel Analysis: CROSS SECTION 1405-1410

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Longitudinal Slope: 0.0400 ft/ft

Flow: 137.7100 cfs

Result Parameters

Depth: 0.4493 ft

Area of Flow: 24.5216 ft^2

Wetted Perimeter: 57.4535 ft

Hydraulic Radius: 0.4268 ft

Average Velocity: 5.6159 ft/s

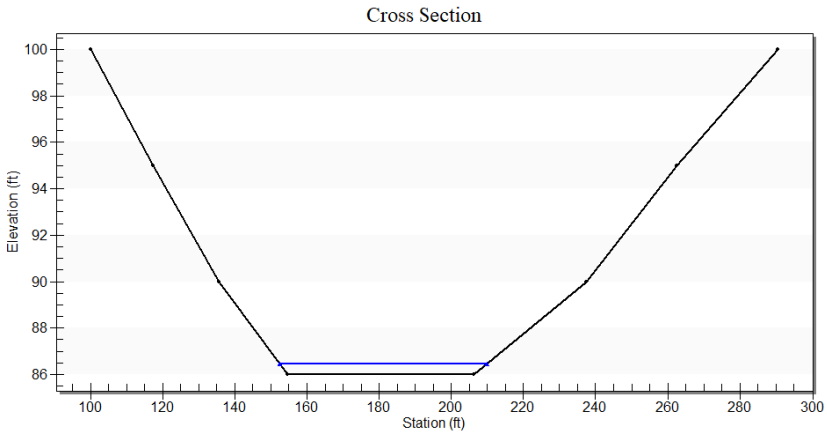
Top Width: 57.3776 ft

Froude Number: 1.5139

Critical Depth: 0.5888 ft

Critical Velocity: 4.2181 ft/s

Critical Slope: 0.0160 ft/ft



Critical Top Width: 59.12 ft

Calculated Max Shear Stress: 1.1215 lb/ft^2

Elevation (ft)	Elevation (ft)	Manning's n
100.00	100.00	0.0300
132.50	95.00	0.0300
165.25	91.00	0.0300
187.63	92.00	0.0300
220.27	95.00	0.0300
255.77	100.00	-----

Calculated Avg Shear Stress: 1.0653 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0300

Channel Analysis: CROSS SECTION 1404-1405

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Longitudinal Slope: 0.0400 ft/ft

Flow: 93.8400 cfs

Result Parameters

Depth: 0.9946 ft

Area of Flow: 15.1185 ft^2

Wetted Perimeter: 30.4845 ft

Hydraulic Radius: 0.4959 ft

Average Velocity: 6.2070 ft/s

Top Width: 30.4018 ft

Froude Number: 1.5511

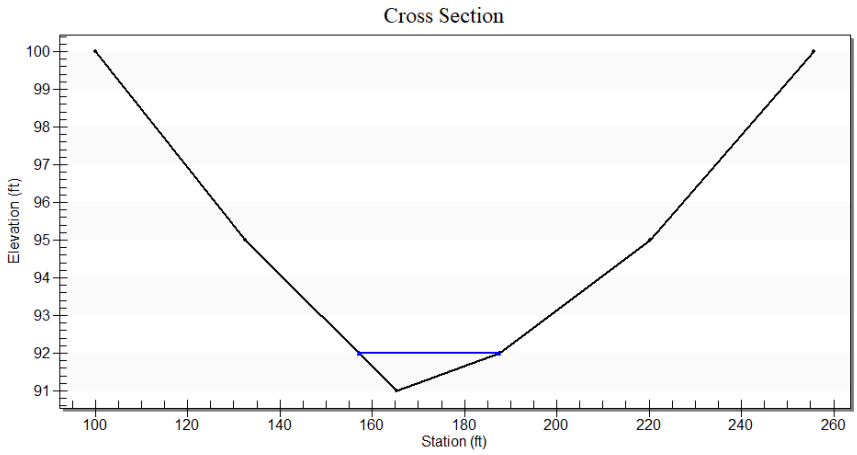
Critical Depth: 1.1777 ft

Critical Velocity: 4.4649 ft/s

Critical Slope: 0.0155 ft/ft

Critical Top Width: 33.96 ft

Calculated Max Shear Stress: 2.4825 lb/ft^2



Calculated Avg Shear Stress: 1.2379 lb/ft^2

Composite Manning's n Equation: Lotter method

Elevation (ft)	Elevation (ft)	Manning's n
100.00	100.00	0.0300
128.08	95.00	0.0300
162.51	91.00	0.0300
168.52	90.00	0.0300
177.00	91.00	0.0300
203.62	95.00	0.0300
229.14	100.00	-----

Manning's n: 0.0300

Channel Analysis: CROSS SECTION 299-1410

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Longitudinal Slope: 0.0400 ft/ft

Flow: 87.1700 cfs

Result Parameters

Depth: 1.2838 ft

Area of Flow: 11.9721 ft^2

Wetted Perimeter: 19.0007 ft

Hydraulic Radius: 0.6301 ft

Average Velocity: 7.2811 ft/s

Top Width: 18.8217 ft

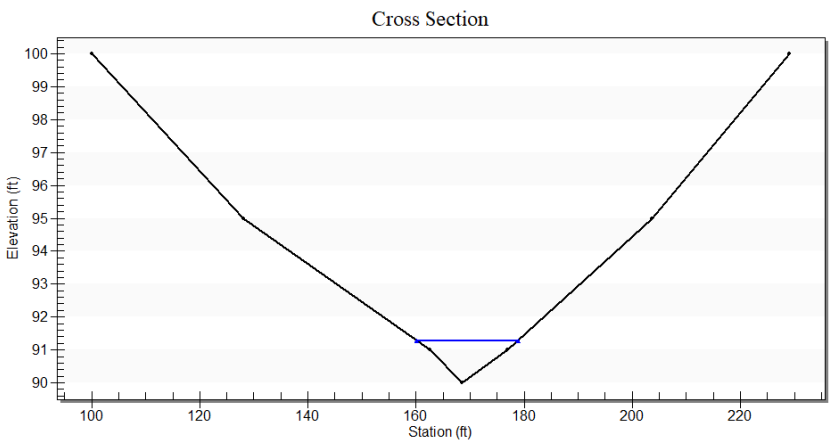
Froude Number: 1.6088

Critical Depth: 1.5511 ft

Critical Velocity: 4.9673 ft/s

Critical Slope: 0.0145 ft/ft

Critical Top Width: 22.90 ft



Calculated Max Shear Stress: 3.2044 lb/ft^2

Calculated Avg Shear Stress: 1.5727 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0300

Elevation (ft)	Elevation (ft)	Manning's n
100.00	100.00	0.0300
131.52	95.00	0.0300
158.88	90.00	0.0300
169.63	88.00	0.0300
187.25	88.00	0.0300
196.38	90.00	0.0300
201.21	91.00	0.0300
217.31	91.00	0.0300
231.96	95.00	0.0300
254.13	100.00	-----

Channel Analysis: CROSS SECTION 199-1405

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Longitudinal Slope: 0.0400 ft/ft

Flow: 40.2200 cfs

Result Parameters

Depth: 0.4045 ft

Area of Flow: 7.9414 ft^2

Wetted Perimeter: 21.7254 ft

Hydraulic Radius: 0.3655 ft

Average Velocity: 5.0646 ft/s

Top Width: 21.6443 ft

Froude Number: 1.4735

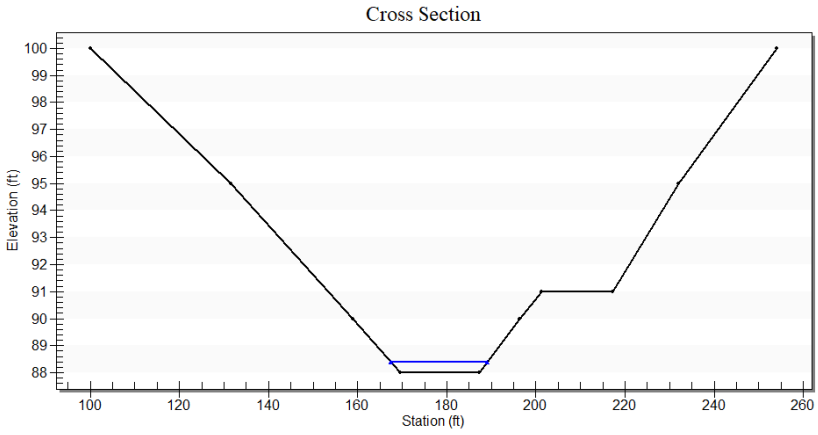
Critical Depth: 0.5176 ft

Critical Velocity: 3.8471 ft/s

Critical Slope: 0.0171 ft/ft

Critical Top Width: 22.77 ft

Calculated Max Shear Stress: 1.0095 lb/ft^2



Calculated Avg Shear Stress: 0.9124 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0300

APPENDIX J

Technical Memorandum Addressing Hydrology and Water Quality for Emergency Access Road

RICK
ENGINEERING COMPANY

May 14, 2024

City of San Diego
Development Services
101 Ash Street
San Diego, California 92101

SUBJECT: SOUTHWEST VILLAGE – TECHNICAL MEMORANDUM ADDRESSING HYDROLOGY AND WATER QUALITY FOR EMERGENCY VEHICLE ACCESS ROAD "PROJECT ALTERNATIVE"
(RICK ENGINEERING COMPANY JOB NUMBER 15013-C)

1. Introduction

This letter report presents the existing and proposed hydrology and water quality analysis associated with the proposed emergency vehicle access road "Project Alternative" that runs north to south from the existing Jeep Trail to the United States Mexico border fence where it connects with the continuation of the Jeep Trail (herein referred to as the "project"). The project is adjacent to the Southwest Village project area. The Southwest Village project is a smaller portion of the overall community of Otay Mesa. Specifically, the Southwest Village project boundary is generally located south of State Route 905, east of Interstate 805, north of US-Mexico border, and immediately west of the northerly branch of Spring Canyon.

The proposed improvements for this "Project Alternative" include use of an existing jeep trail to serve as emergency vehicle access as a secondary access route into and out of the overall project limits. For much of the trail, the unimproved road is already established and traversable, however, there are locations which exceed 10% to 15% grades. Based on coordination with the project design team and local fire officials, it's our understanding that segments that exceed 10% should be paved, whereas the flatter segments can remain unpaved. The following sections of this memorandum address Drainage (aka Hydrology) and Water Quality considerations for this emergency vehicle access.

2. Drainage Characteristics, Methodology and Results (i.e. – "Hydrology")

As mentioned above, the emergency vehicle access road will generally follow the horizontal alignment of an existing jeep trail and will only be adjusted vertically as-needed to reduce the existing steep segments that are currently greater than 15% to be 15% or less. From a drainage perspective, the design will maintain existing drainage boundaries and flow patterns between existing and proposed conditions. To help illustrate the drainage characteristics, an exhibit has

been prepared and the drainage boundaries are described as Basins 1, 2, and 3, for the extents of the EVA alignment that will connect from near the border fence at the south end to the development limits on the mesa (to the north). The overall existing condition of the project (Basin 1, 2, and 3) can be described as natural hills, canyons, and unpaved trails with grasses and sparce shrubbery. An overall existing percent impervious of 0% has been identified for Basins 1, 2, and 3, where little to no existing pavement is present. The proposed pavement for segments steeper than 10% will increase runoff slightly, however, the design maintains the existing drainage boundaries and patterns and allows for runoff to continue to sheet across the surrounding pervious areas for Basins 1 and 2, and will be conveyed via ditches in Basin 3 to an existing drainage collection facility in the Federal property adjacent to the border fence.

The rational method was used to approximate peak flow rates for Basins 1, 2, and 3 using guidance from the "City of San Diego Transportation & Storm Water Design Manuals Drainage Design Manual," January 2017 edition (herein referred to as The Drainage Design Manual). The 100-year storm event was used as the design storm event and a five-minute time of concentration was assumed in rational method calculations (which is conservative, actual times of concentration are likely a bit longer and result in lower corresponding intensities and peak flow rates. For the purposes of this comparison, it's been assumed that the entire segment of EVA road is paved within Basins 1, 2, and 3; whereas the current proposed approach would only pave the segments greater than 10%. Rational method results are shown below in Table 1.

Table 1: Existing and Proposed Hydrology for Emergency Vehicle Access

Drainage Basin #	POI #	Project Condition	Percent impervious	Runoff Coefficient	Tributary Area	Intensity	100-year Flow Rates,	% Change in 100-yr Peak Discharge (Pre to Post)
				C[1]	A	I[2]	Q_{100}	
			%		(acres)	(in/hr)	(cfs)	
1	1	Pre-project	0%	0.45	21.1	4.4	41.8	2%[3]
	1	Post-project	2%	0.46	21.1	4.4	42.5	
2	2	Pre-project	0%	0.45	5.4	4.4	10.7	4%[4]
	2	Post-project	4%	0.47	5.4	4.4	11.2	
3	3	Pre-project	0%	0.45	12.8	4.4	25.3	5%[5]
	3	Post-project	5%	0.47	12.8	4.4	26.7	

Notes:

1. Runoff coefficients were determined using Table A-1. Runoff Coefficients for Rational Method located in Appendix A of the Drainage Design Manual.
2. Intensity was determined based on a 100-year storm event and a 5-minute time of concentration for each basin. Figure A-1 Intensity-Duration-Frequency Design Chart in Appendix A of the Drainage Design Manual was used.
3. Basin 1 discharges to a sump within Basin 1's drainage boundaries. Although the 100-year peak discharge is shown to increase from Basin 1 it is anticipated that the surrounding area will see no increase in storm water runoff.
4. Basin 2 ultimately discharges to Basin 1. Although the 100-year peak discharge is shown to increase from Basin 2 it is anticipated that the surrounding area will see no increase in storm water runoff.
5. Basin 3 discharges to a sump near the existing Border Fence, to an existing drainage facility just east of the existing access road near the bottom of the steep slope. There will be slight increase in runoff to this location based on the proposed pavement, however, it will be conveyed via brow ditches down the steep segments and dissipated via riprap near the low points of each side of the road, prior to entering the existing drainage facilities. The increase is shown to be 5% without considering attenuation effects within the existing sump area and due to the existing drainage outlet works. This minimal increase is considered negligible.

The following describes each of the three (3) drainage basins in further detail:

In the existing condition, Basin 1, flows in a southwesterly direction to a low point located within Basin 1's drainage boundaries (POI-1). Basin 1 ultimately discharges to POI-1. In the proposed project condition Basin 1 will remain very similar to the existing project condition. The only improvement proposed in Basin 1 is a portion of paved emergency access road. This will slightly increase the percent impervious of Basin 1. All other drainage characteristics of Basin 1 will remain the same. It is anticipated that because Basin 1 discharges to a low point within its own drainage boundary proposed improvements to Basin 1 will not result in an increase of stormwater runoff to the surrounding area.

In the existing condition, Basin 2, flows in a southwesterly direction to a low point located within Basin 2 (POI-2). Basin 2 in the proposed project condition will remain very similar to the existing project condition. The only improvement proposed in the post-project condition of Basin 2 will be a portion of paved emergency access road. All other drainage characteristics of Basin 2 will remain the same. It is anticipated that in the 100-year storm event may overtop the local sump located at POI-2 and flow into Basin 1. Since runoff within Basin 2 is also contained within existing sump areas at POI-2 and POI-1, there is no net increase of runoff in the proposed condition from the project site in the event of a 100-year storm.

In the existing condition Basin 3 drains south before entering an existing drainage facility near the border fence (POI-3). The existing drainage facility appears to be hydraulically connected to a culvert which crosses the border. Drainage on the southside of the border makes its way westerly and connects into the Tijuana River. Based upon the available information, it is assumed that the runoff is conveyed via a system of storm drain and open channels to a concrete lined reach of the Tijuana River on the Mexican side of the border. In the proposed condition

Basin 3 will follow the same drainage pattern and discharge to POI-3. An increase of 1.4 cfs is anticipated at POI-3, which represents a 5% increase. This minor increase is considered negligible and is likely attenuated further within the existing sump and drainage outlet structure.

3. Water Quality Analysis, Methodology and Results

Basins 1 and 2 qualify as a singular self-mitigating DMA per section 5.2.1 of "The City of San Diego Stormwater Standards," last revised May 2021 (herein referred to as "The Storm Water Standards"). The impervious area within Basin 1 and 2 is 2 and 4 percent respectively of the surrounding drainage area from which runoff will dissipate across the existing pervious areas, which is less than the 5% allowable for self-mitigating areas. Furthermore, these areas do not discharge beyond the existing low points, so there is no concern for the discharge of pollutants from these two drainage basins.

Basin 3 discharges to POI-3. The amount of impervious area within this drainage basin is also at the 5% or less threshold to qualify for a self-mitigating DMA, however, the drainage is not able to surface discharge across large portions of the surrounding pervious areas as typically intended for self-mitigating DMAs. Due to the steep grades of the existing road, and the adjacent steep hillsides draining towards the roadway corridor, brow ditches have been proposed to help collect runoff from the roadway (and in some cases the surrounding hillside) and discharge it towards the south in the vicinity of the existing drainage collection facility. Riprap would be used at the end of the brow ditches on both sides of the improved roadway. The paving of this section is needed to provide emergency vehicle access which means the typical pollutants associated with a roadway are not expected to occur along this segment. The addition of permanent storm water BMPs is not very practical or feasible given the steep grades along the existing road alignment, nor at the low point as the property is not under the ownership of this project and is part of the federal ownership associated with the border fence. Due to these constraints, the lack of actual traffic and associated pollutants of concern, and the amount of impervious area is still equal to 5% or less, we recommend allowing this reach to remain untreated, whether it's categorized as a self-mitigating DMA or untreated DMA.

6. Conclusion

This letter report presents the existing and proposed hydrology and water quality analysis for the emergency vehicle access "project alternative" for the overall project. Peak flow rates for the 100-year storm event were determined using the Rational Method in conformance with the Drainage Design Manual. From a drainage or hydrological perspective, the change to peak flow rates are minimal in each of the three (3) drainage basins, estimated at less than 5% in each case, two of which are self-contained within existing low points and do not discharge from the site. From a water quality perspective, pollutants of concern are not anticipated to be present as they would for a normal use roadway. Stormwater runoff occurring within Basins 1 and 2 meet the

criteria associated with self-mitigating DMAs since the amount of impervious area will be equal to or less than 5% of the overall drainage management area (DMA). The paved sections will runoff across pervious areas before eventually reaching the existing low points which do not discharge from the site. For Basin 3, the amount of impervious area is also equal to or less than 5% of the overall DMA, however, it has less opportunity to discharge across the surrounding pervious areas due to the steep hillsides draining towards the existing road alignment. Due to the physical constraints along this segment, the lack of actual traffic and associated pollutants of concern, and the amount of impervious area is still equal to 5% or less, we recommend allowing this segment to remain untreated, whether it's categorized as a self-mitigating DMA or untreated DMA. The eventual discharge from Basin 3 is collected near the border fence in an existing drainage structure, conveyed south into Mexico, and eventually outlets into the concrete-lined Tijuana River further west within Mexico.

The combined post project drainage map / drainage management area exhibit is included in Attachment 2 of this letter.

Please feel free to contact Eric Hengesbaugh or myself if you have any questions and/or concerns at (619) 291-0707.

Sincerely,

RICK ENGINEERING COMPANY



Brendan Hastie, P.E.
R.C.E. #65809, Exp. 9/25
Principal

BH:EGH:vs/files/Report/15013-C.017

Attachment 1

Normal Depth Drainage Ditch and Storm Drain Sizing

Hydraulic Analysis Report

Project Data

Project Title: Drainage Conduit

Designer:

Project Date: Monday, May 13, 2024

Project Units: U.S. Customary Units

Notes:

Channel Analysis: West Type "A" Lined Ditch

Notes:

Input Parameters

Channel Type: Triangular

Side Slope 1 (Z1): 2.5000 ft/ft

Side Slope 2 (Z2): 2.5000 ft/ft

Longitudinal Slope: 0.1450 ft/ft

Manning's n: 0.0130

Flow: 10.4000 cfs

Result Parameters

Depth: 0.5023 ft

Area of Flow: 0.6307 ft^2

Wetted Perimeter: 2.7048 ft

Hydraulic Radius: 0.2332 ft

Average Velocity: 16.4897 ft/s

Top Width: 2.5114 ft

Froude Number: 5.7987

Critical Depth: 1.0145 ft

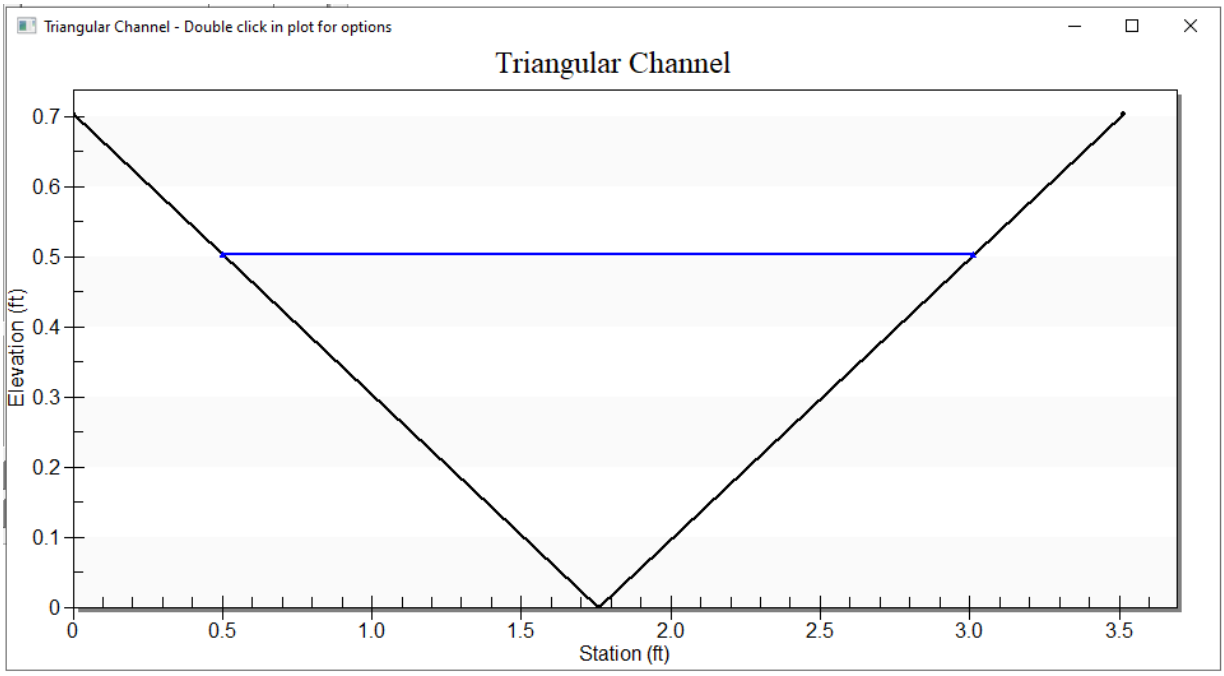
Critical Velocity: 4.0416 ft/s

Critical Slope: 0.0034 ft/ft

Critical Top Width: 5.07 ft

Calculated Max Shear Stress: 4.5446 lb/ft^2

Calculated Avg Shear Stress: 2.1098 lb/ft^2



Runnoff from the 100-year storm event has been modeled and is shown as the blue line in the cross-section of the drainage ditch located west of the emergency evacuation route above. An 18-inch deep Type “A” lined ditch is proposed. Per “City of San Diego Standard Drawings for Engineering and Capital Improvement Projects Construction 2021 Edition.”

Channel Analysis: East Type "A" Lined Ditch

Notes:

Input Parameters

Channel Type: Triangular

Side Slope 1 (Z1): 2.5000 ft/ft

Side Slope 2 (Z2): 2.5000 ft/ft

Longitudinal Slope: 0.1450 ft/ft

Manning's n: 0.0130

Flow: 16.3000 cfs

Result Parameters

Depth: 0.5945 ft

Area of Flow: 0.8835 ft^2

Wetted Perimeter: 3.2013 ft

Hydraulic Radius: 0.2760 ft

Average Velocity: 18.4502 ft/s

Top Width: 2.9723 ft

Froude Number: 5.9639

Critical Depth: 1.2143 ft

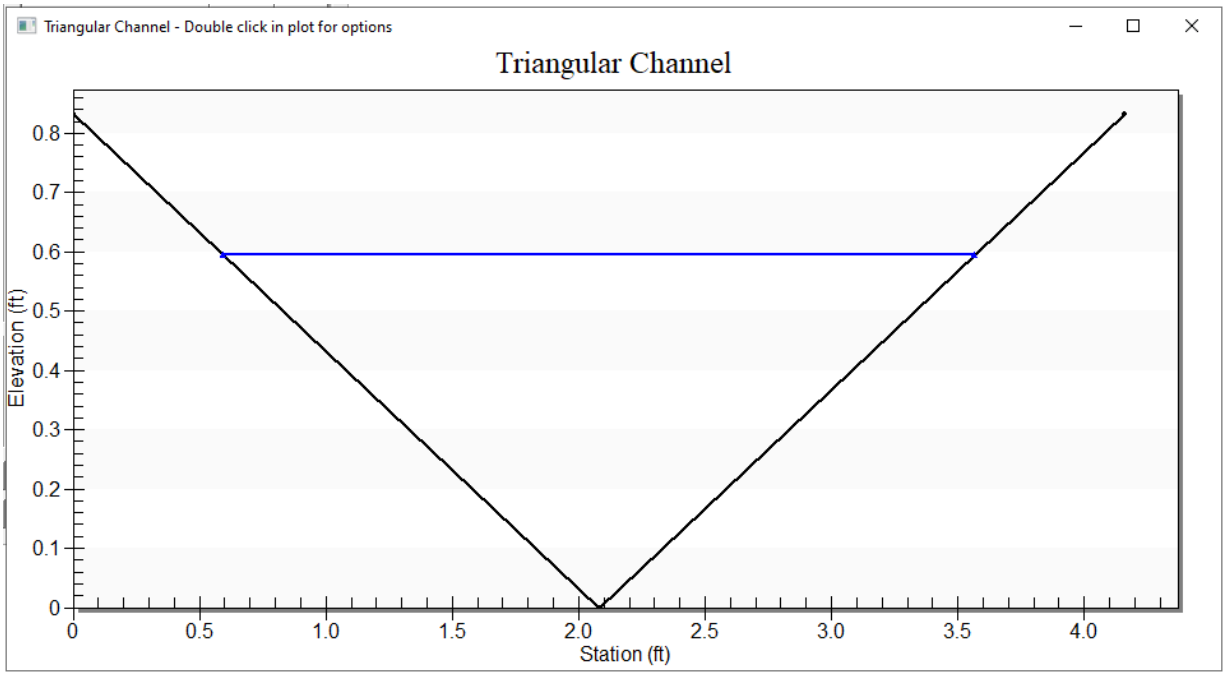
Critical Velocity: 4.4216 ft/s

Critical Slope: 0.0032 ft/ft

Critical Top Width: 6.07 ft

Calculated Max Shear Stress: 5.3787 lb/ft^2

Calculated Avg Shear Stress: 2.4970 lb/ft^2



Runnoff from the 100-year storm event has been modeled and is shown as the blue line in the cross-section of the drainage ditch located east of the emergency evacuation route above. An 18-inch deep Type “A” lined ditch is proposed. Per “City of San Diego Standard Drawings for Engineering and Capital Improvement Projects Construction 2021 Edition.”

Channel Analysis: CrossEvacRoadSD

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0130

Flow: 10.4000 cfs

Result Parameters

Depth: 1.2161 ft

Area of Flow: 1.5347 ft^2

Wetted Perimeter: 3.3622 ft

Hydraulic Radius: 0.4565 ft

Average Velocity: 6.7765 ft/s

Top Width: 1.1751 ft

Froude Number: 1.0450

Critical Depth: 1.2400 ft

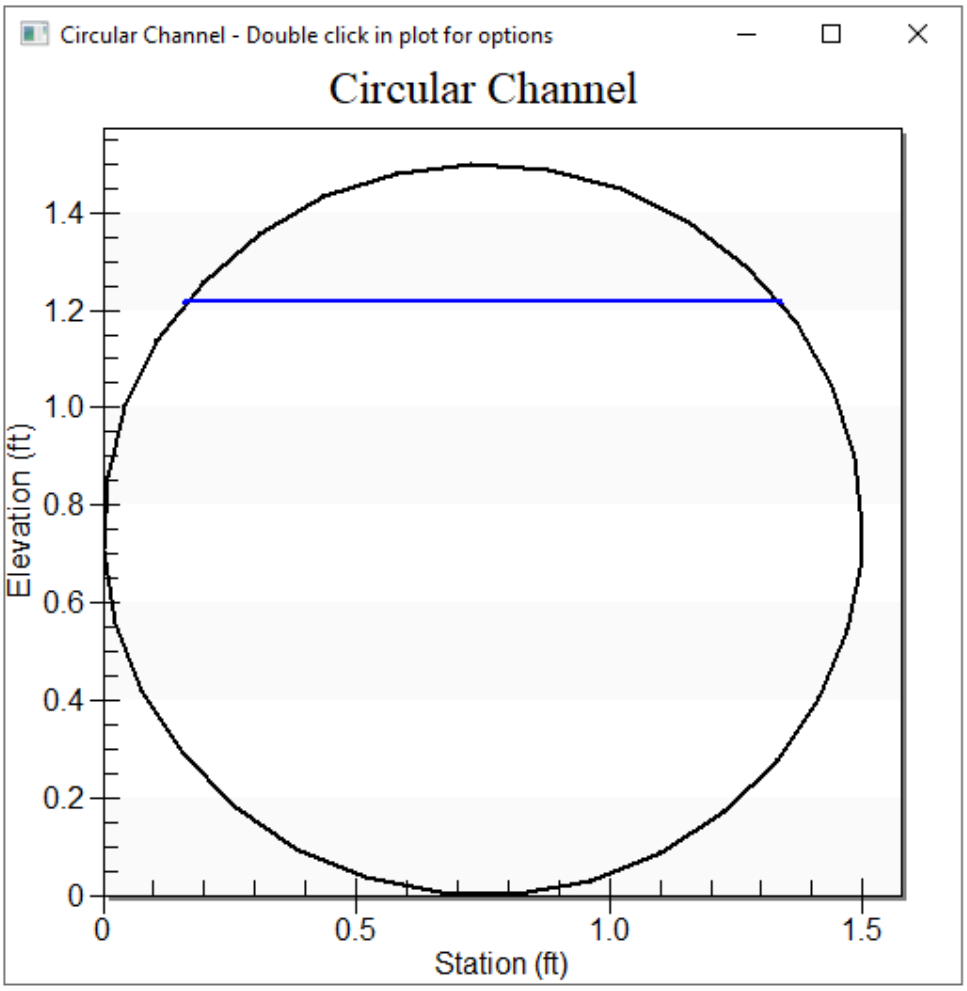
Critical Velocity: 6.6570 ft/s

Critical Slope: 0.0097 ft/ft

Critical Top Width: 1.14 ft

Calculated Max Shear Stress: 0.7589 lb/ft^2

Calculated Avg Shear Stress: 0.2848 lb/ft^2

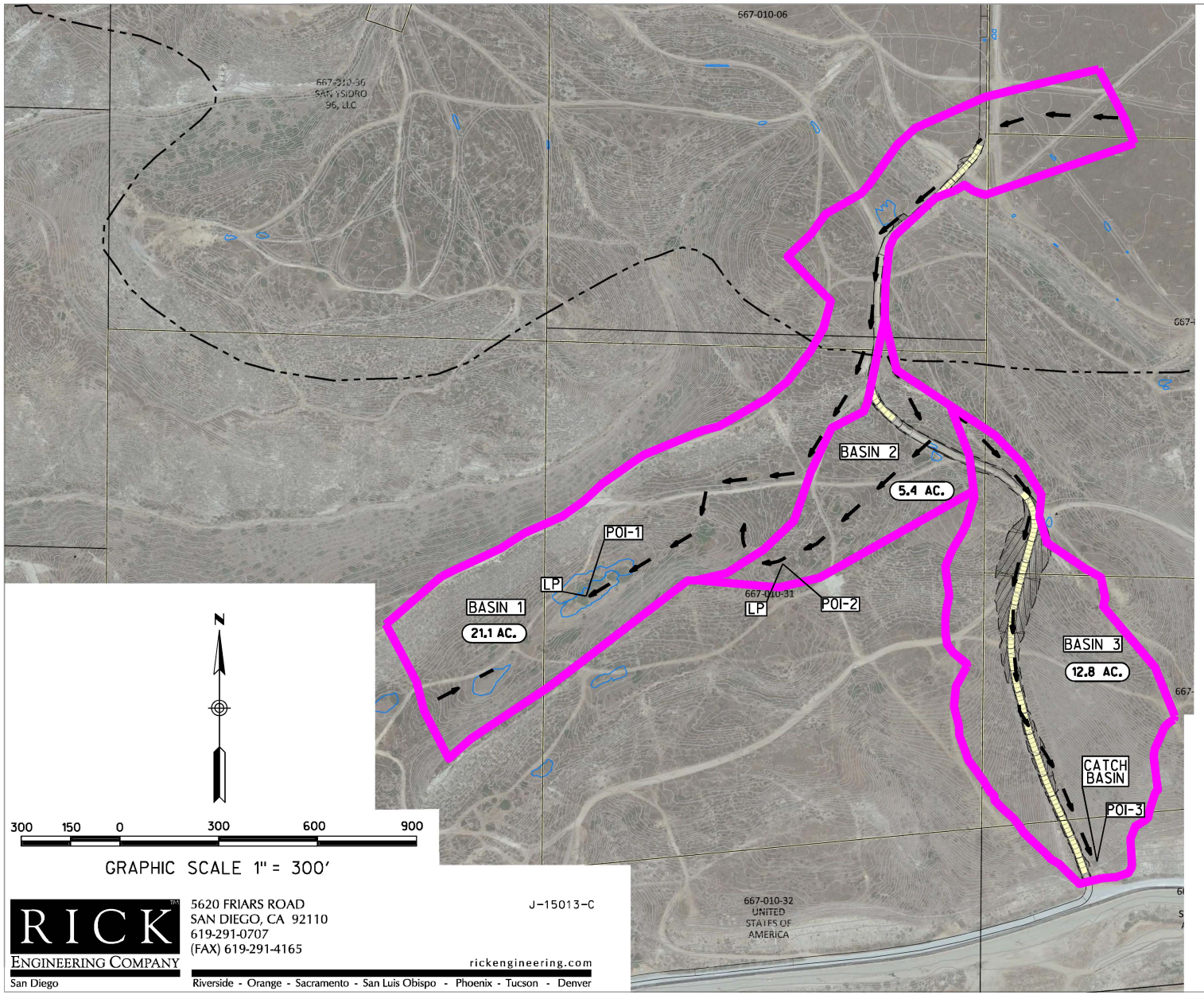


Runnoff from the 100-year storm event has been modeled and is shown as the blue line in the cross-section of the storm drain pipe which crosses the down stream end of the emergancy evacation route, flowing from west to east above. An 18-inch RCP is proposed.

Attachment 2

Post Project Drainage Map / Drainage Management Area Exhibit

(Combined Exhibit)



LEGEND

- POI
- XX.X AC. — BASIN AREA
- MAJOR BASIN BOUNDARY
- EXISTING SHALLOW SUMP OVERFLOW DIRECTION
- FLOW PATH
- POTENTIAL PAVING

NOTES

1. POI-1 IS LOCATED AT A SUMP WITHIN BASIN 1. THERE WILL BE NO NET RUNOFF DISCHARGING FROM BASIN 1.
2. POI-2 IS LOCATED AT A LOCAL SUMP WITHIN BASIN 2. DURING BIGGER STORM EVENTS IT IS ANTICIPATED THE POI-2 WILL DISCHARGE TO BASIN 1.
3. POI-3 IS LOCATED AT A CATCH BASIN WHICH DISCHARGES TO A CULVERT AND IS TRIBUTARY TO THE TIJUANA RIVER

EMERGENCY VEHICLE ACCESS FOR SOUTHWEST VILLAGE VTM (POST-PROJECT)

J-15013-C Date: December 18, 2021

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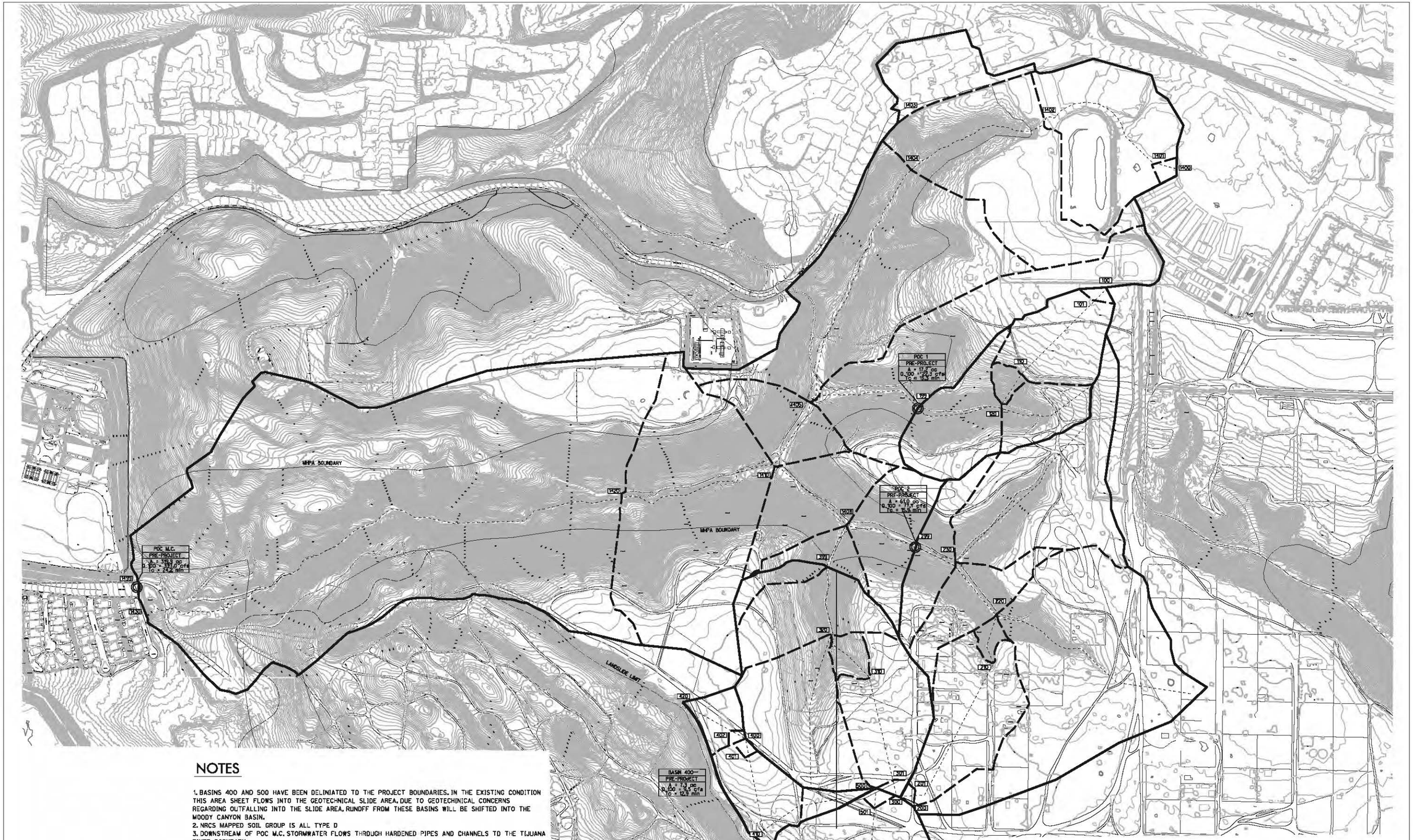
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MAP POCKET 1

Drainage Study Map
for
Southwest Village VTM
[Pre-project]



NOTES

1. BASINS 400 AND 500 HAVE BEEN DELINIATED TO THE PROJECT BOUNDARIES. IN THE EXISTING CONDITION THIS AREA SHEET FLOWS INTO THE GEOTECHNICAL SLIDE AREA, DUE TO GEOTECHNICAL CONCERNS REGARDING OUTFALLING INTO THE SLIDE AREA, RUNOFF FROM THESE BASINS WILL BE SHIFTED INTO THE MOODY CANYON BASIN.
2. NRCS MAPPED SOIL GROUP IS ALL TYPE D
3. DOWNSTREAM OF POC M.C. STORMWATER FLOWS THROUGH HARDENED PIPES AND CHANNELS TO THE TIJUANA RIVER ESTUARY.

LEGEND

- PDI
- XXX — DRIANAGE NODE NUMBER
- XX.X AC. — BASIN AREA
- MAJOR BASIN BOUNDARY
- SUB BASIN BOUNDARY
- FLOW PATH

N

800 100 0 200 400 800

GRAPHIC SCALE 1" = 200'

DRAINAGE EXHIBIT FOR SOUTHWEST VILLAGE VTM (PRE-PROJECT) MOODY CANYON

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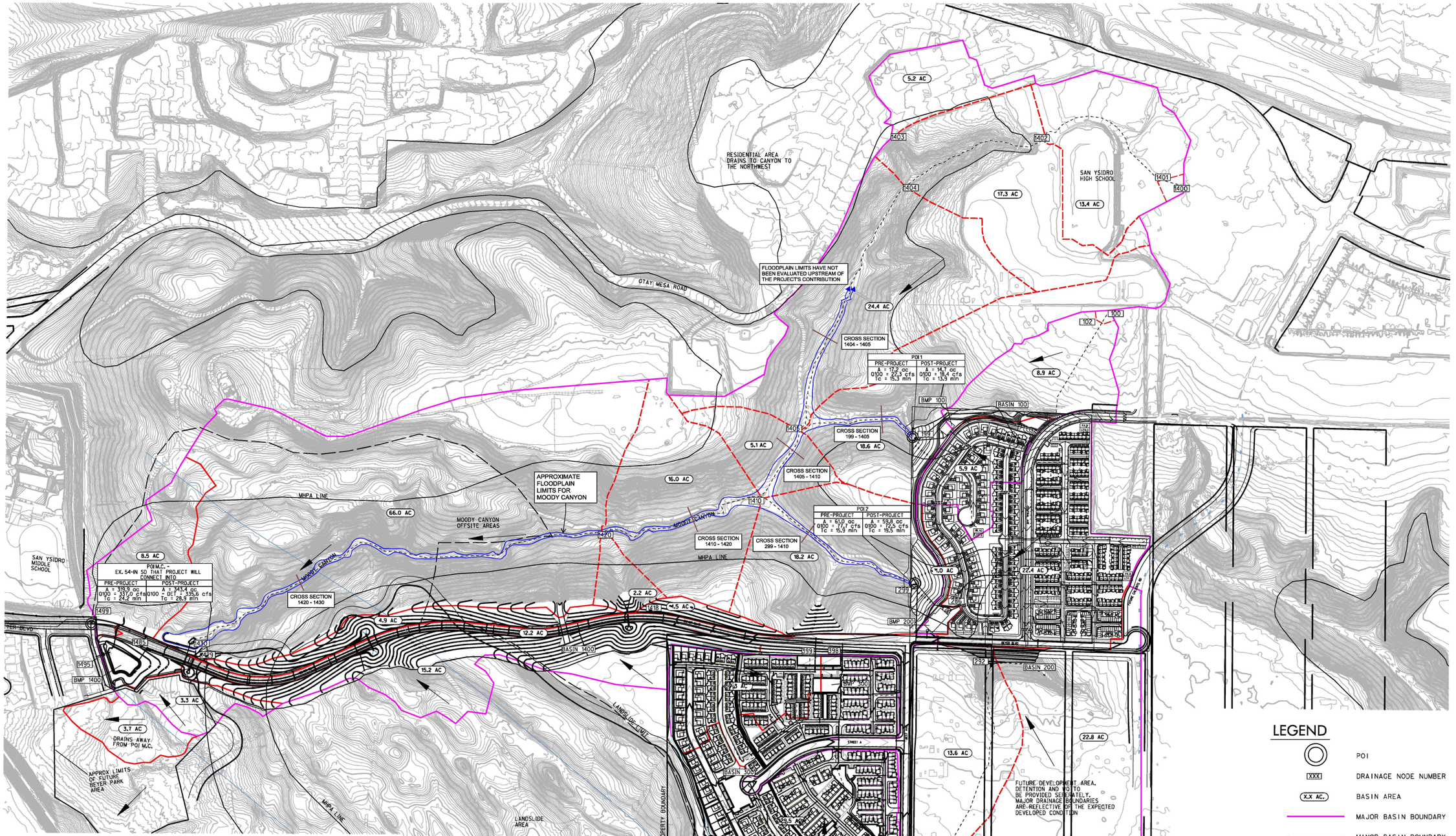
Date: April 28, 2023

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MAP POCKET 2

Drainage Study Map
for
Southwest Village VTM
[Post-project]



Notes:
1. POI M.C. DOES NOT INCLUDE DRAINAGE FROM FUTURE BEYER PARK
3. DOWNSTREAM OF POC MC FLOW CONTINUES THROUGH CONCRETE PIPES AND CHANNELS BEFORE DISCHARING INTO THE TIJUANA ESTUARY
4. DRAINAGE HAS BEEN DESIGNED SUCH THAT NO RUNOFF FROM DEVELOPED PORTIONS OF THE PROJECT AREA DISCHARGE INTO THE LANDSLIDE AREA.

LEGEND

- POI
- XXX — DRAINAGE NODE NUMBER
- X.X AC. — BASIN AREA
- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- SUB BASIN BOUNDARY
- FLOW PATH
- CROSS SECTION
- CONTINUATION ARROW

DRAINAGE EXHIBIT FOR SOUTHWEST VILLAGE VTM (POST-PROJECT) MOODY CANYON

Sheet 1 of 4

April 28, 2023

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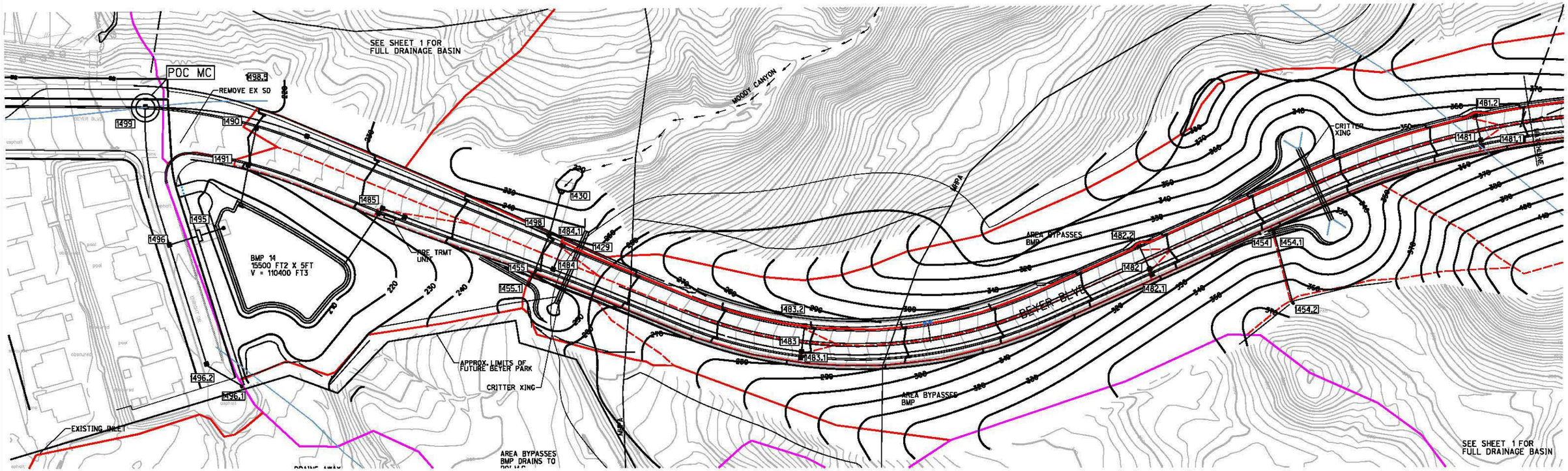
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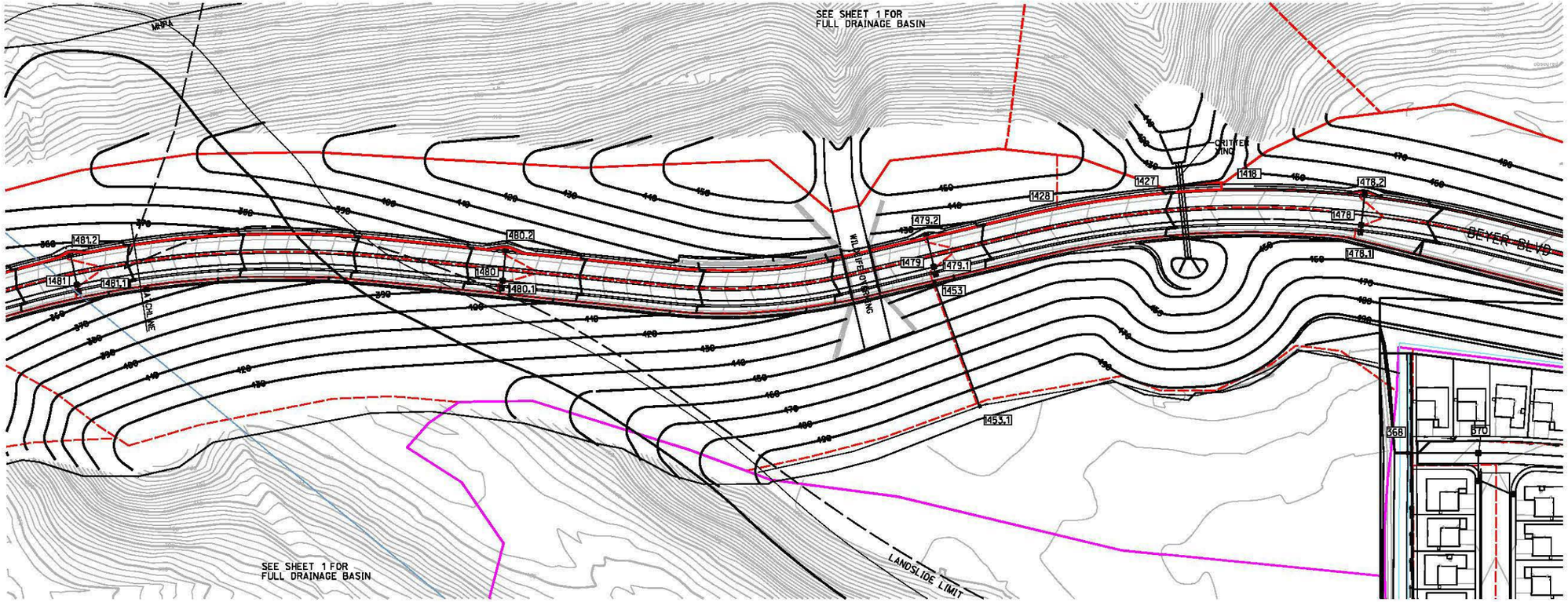
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GRAPHIC SCALE 1"= 200'

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LEGEND

- POI
- XXX — DRAINAGE NODE NUMBER
- X.X AC. — BASIN AREA
- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- SUB BASIN BOUNDARY
- FLOW PATH

N

60 30 0 60 120 180

GRAPHIC SCALE 1" = 60'

DRAINAGE EXHIBIT FOR SOUTHWEST VILLAGE VTM (POST PROJECT)

Beyer Road

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Sheet 2 of 4

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POC 3B

POC 3A

2X B-24 MWS

CONTEC 8C

CONTEC 8C

BMP 3
20,000 FT2 X 10 FT
VOL = 180950 CF

STREET A

WEST AVE

PROPERTY BOUNDARY

INSIDE LMP

LEGEND

- POI
- XXX — DRAINAGE NODE NUMBER
- X.X AC. — BASIN AREA
- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- SUB BASIN BOUNDARY
- FLOW PATH

N

60 30 0 60 120 180

GRAPHIC SCALE 1" = 60'

SEE SHEET 1 FOR DELINIATION OF OFFSITE AREAS.

DRAINAGE EXHIBIT FOR SOUTHWEST VILLAGE VTM (POST PROJECT)

Sheet 3 of 4

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BASIN 300
PA 10-14

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SEE SHEET 1 FOR DELINIATION
OF OFFSITE AREAS.

POC 1

POC 2

8-8 MWS

8-24 MWS

BMP 1
3500 FT2 X
5.67FT
VOL = 18342 CF

BMP 2
8500 FT2 X
7.5FT
VOL = 59639 CF

CONTEC 5C

CONTEC 8C

16+30.50 LP
478.33 FG

17+95.20 HP
485.97 FG

12+65 HP
481.55 FG

6+49.67 LP
470.58 FG

10+96.54 LP
473.94 FG

26+81.73 HP
511.57 FG

PA 9
LOT 2

PA 10
LOT 3

PA 8
LOT 1

PROPERTY BOUNDARY

PROPERTY BOUNDARY

LEGEND

- POI
- XXX — DRAINAGE NODE NUMBER
- X.X AC. — BASIN AREA
- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- SUB BASIN BOUNDARY
- FLOW PATH

N

60 30 0 60 120 180

GRAPHIC SCALE 1" = 60'

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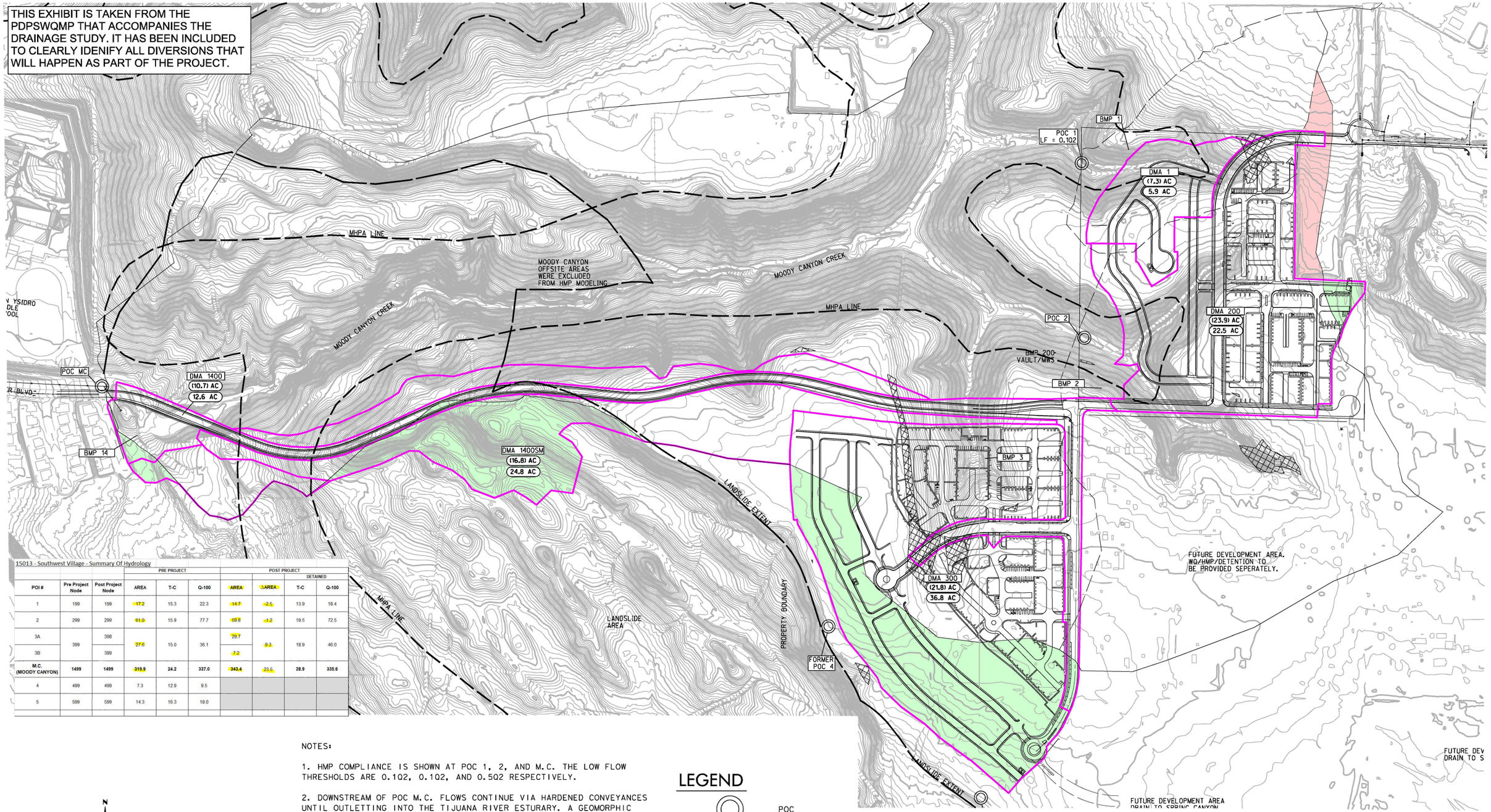
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DRAINAGE EXHIBIT FOR SOUTHWEST VILLAGE VTM (POST PROJECT)

BASIN 100
& 200
PA 8-10

Sheet 4 of 4
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THIS EXHIBIT IS TAKEN FROM THE PDPSWQMP THAT ACCOMPANIES THE DRAINAGE STUDY. IT HAS BEEN INCLUDED TO CLEARLY IDENIFY ALL DIVERSIONS THAT WILL HAPPEN AS PART OF THE PROJECT.



15013 - Southwest Village - Summary Of Hydrology

POI #	Pre Project Node	Post Project Node	PRE PROJECT AREA	PRE PROJECT T-C	PRE PROJECT Q-100	POST PROJECT AREA	POST PROJECT DETAINED AREA	POST PROJECT DETAINED T-C	POST PROJECT DETAINED Q-100
1	199	199	17.2	15.3	22.3	14.7	2.5	13.9	18.4
2	299	299	61.0	15.9	77.7	59.8	1.2	19.5	72.5
3A	399	398	27.6	15.0	36.1	29.7	9.3	18.9	46.0
3B		399				7.2			
M.C. (MOODY CANYON)	1499	1499	319.9	24.2	337.0	343.4	23.5	28.9	335.6
4	499	499	7.3	12.9	9.5				
5	599	599	14.3	16.3	18.0				

NOTES:

1. HMP COMPLIANCE IS SHOWN AT POC 1, 2, AND M.C. THE LOW FLOW THRESHOLDS ARE 0.102, 0.102, AND 0.502 RESPECTIVELY.

2. DOWNSTREAM OF POC M.C. FLOWS CONTINUE VIA HARDENED CONVEYANCES UNTIL OUTLETTING INTO THE TIJUANA RIVER ESTURARY. A GEOMORPHIC CHANNEL ASSESSMENT WILL BE PERFORMED AS PART OF FINAL ENGINEERING.

3. GEOTECHNICAL ENGINEERS HAVE DEEMED THAT PLACING STORM DRAIN OUTFALLS IN THE LANDSLIDE REGION IS UNFEASIBLE. THEREFORE A SIGNIFICANT DIVERSION WILL BE REQUIRED FOR AREAS THAT ARE SLATED FOR DEVELOPMENT THAT NATURALLY DRAIN INTO THAT AREA. THE FOUR BMPs PROPOSED AS PART OF THE PROJECT WORK TO OFFSET NEGATIVE IMPACTS DUE TO THE DIVERSION.

4. BASED ON THE SAN DIEGO REGIONAL MAPPING DOCUMENT, THERE IS A FEW POTENTIAL CRITICAL COURSE SEDIMENT YIELD AREAS THAT ARE IDENTIFIED WITHIN THE PROJECT AREA. WHERE THE PCCSYA EXISTS, A MORE DETAILED ANALYSIS MAY BE REQUIRED PRIOR TO OR DURING THE FINAL ENGINEERING (CONSTRUCTION DOCUMENT) STAGE TO ADDRESS THE REQUIREMENTS.

LEGEND

- POC
- DMA 300 — DMA ID
- (X,X) AC — BASIN AREA PRE PROJECT
- X,X AC — BASIN AREA POST PROJECT
- PRE PROJECT MAJOR BASIN BOUNDARY
- PRE PROJECT MINOR BASIN BOUNDARY
- POST PROJECT MAJOR BASIN BOUNDARY
- POST PROJECT MINOR BASIN BOUNDARY
- DIVERSIONS INTO MOODY CANYON
- DIVERSIONS OUT OF MOODY CANYON
- PCCSYA

N

200 100 0 200 400 600

GRAPHIC SCALE 1" = 200'

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HYDROMODIFICATION EXHIBIT FOR SOUTHWEST VILLAGE VTM

Sheet 1 of 1

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