Appendix F-1

Preliminary Hydrology Report for Crescent Gardens Cemetery

January 2025

prepared by Hunsaker & Associates Irvine Inc

January 2025

PRELIMINARY HYDROLOGY REPORT

For

CRESCENT GARDENS CEMETERY
Meadowbrook Community
CUP23002

County of Riverside, CA

Prepared For:

Muslim Mortuary & Cemetery Committee

13121 Brookhurst Street, Suite C
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WO#: 4427-2 PHydroRpt Crescent Gardens

PRELIMINARY HYDROLOGY REPORT
FOR
CRESCENT GARDENS CEMETERY
MEADOWBROOK COMMUNITY
CUP230002
COUNTY OF RIVERSIDE

Prepared For:

MUSLIM MORTUARY & CEMETERY COMMITTEE

13121 Brookhurst Street, Suite C.
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01/08/25

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PRELIMINARY HYDROLOGY REPORT
FOR
CRESCENT GARDENS CEMETERY
CUP230002

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SECTION 1
DISCUSSION

A. PROJECT SITE

The Project Site for the Crescent Gardens Cemetery is located in the SW ¼ and SE ¼ of Section 22, T5S, R4W S.B.B.M. in the Meadowbrook Area of Riverside County, California. The Project Site is to the east of the terminus of Garfield Street, as shown in Figure 1.

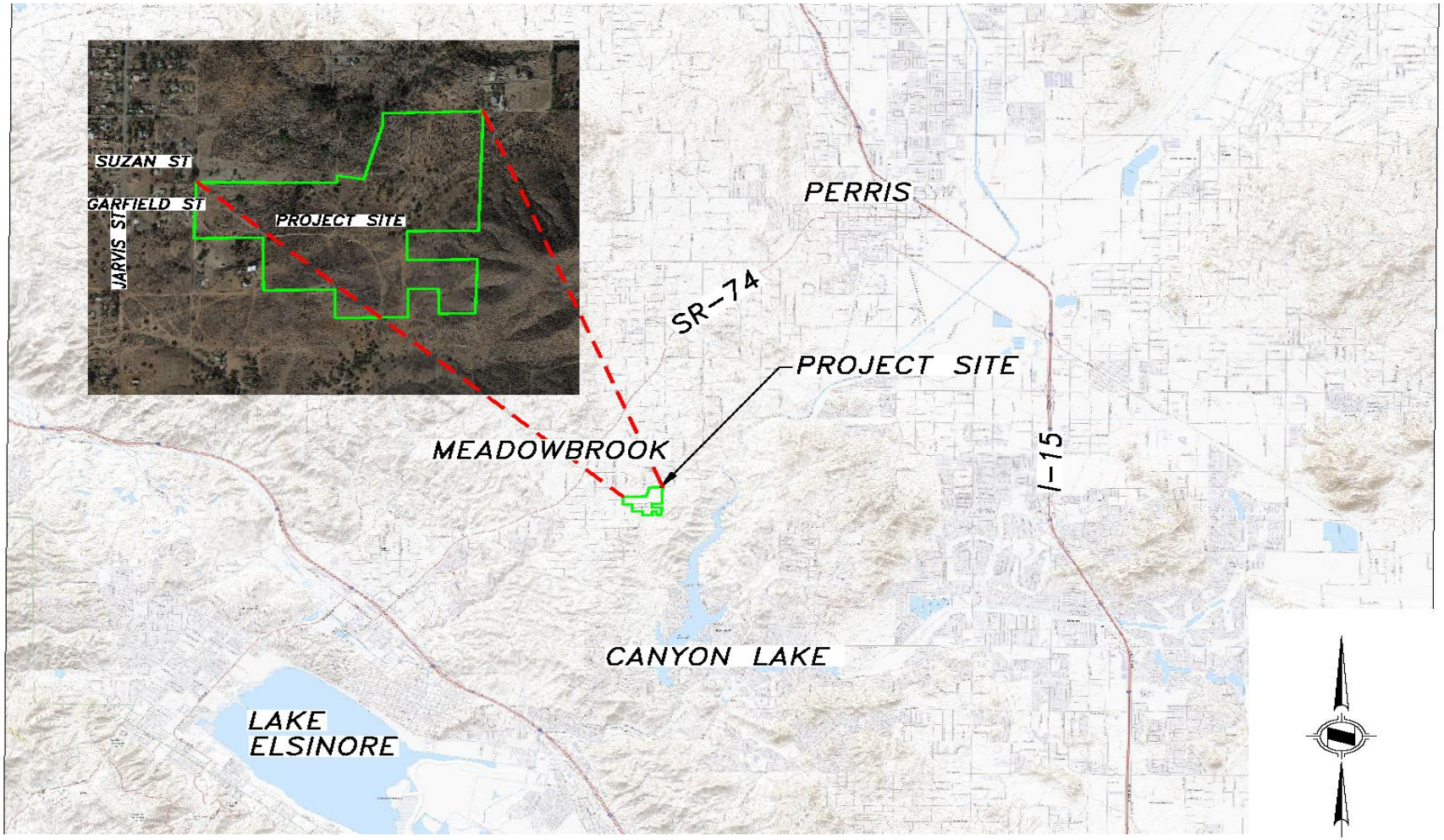
B. PURPOSE AND SCOPE

The purpose of this study is to perform hydrologic study of the Project Site for pre-project and post-project conditions, and to provide preliminary sizing of the drainage facilities needed to provide attenuation for 10-year storm event, and flood protection from the 100-year storm event.

The scope of this study includes the following:

- Provide Rational Method hydrologic calculations for the 2 year, 10-year, and 100-year storms for pre-project (existing) condition.
- Provide Rational Method hydrologic calculations for the 2 year, 10-year, and 100-post-project (proposed) condition for the sizing of the proposed storm drain facilities.
- Provide Existing Condition and Proposed Condition hydrology maps showing delineated drainage areas and points of discharge as a result of the Rational Method calculations included in this report.
- Provide sizing of proposed basin for the purpose of flood control attenuation.
- Provide Unit Hydrograph calculations to support the sizing of proposed basins.
- Provide hydraulics calculations to support the design of proposed storm drain facilities.

Figure 1. Vicinity Map



C. EXISTING CONDITION

The project site is composed of 100% undeveloped land. A topographic analysis of the Project Site indicates that the site contains several ridges that create several drainage basins and points of off-site discharge on the property. For the purposes of this report, these Drainage Basins are designated as Areas A, D, E, F, G, H, I, and J (see Figure 2).

Drainage Area A, the largest Drainage Basin in this study, drains toward project site from northwest and originates from developed residential property located south of Senola Ave. Drainage Area A drains from the west onto, through and then off the property.

Drainage Area D is a small area located southwest end of the property. Drainage on Area D originates on the property then drains off the property to the southwest.

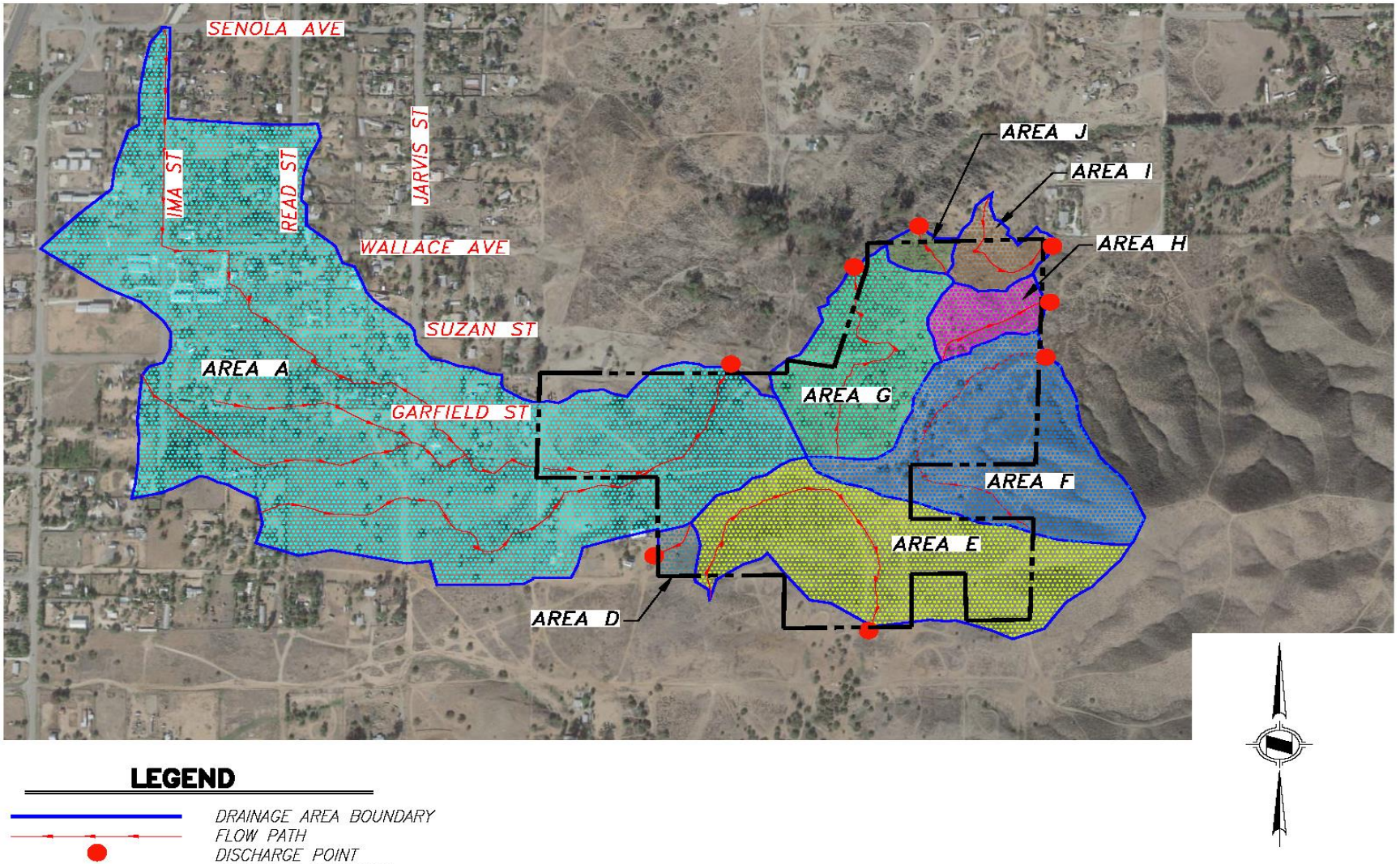
Drainage Area E is an area located south end of the property. Most of the drainage from Area E originates on the property where it eventually drains south off the property.

Drainage Area F is an area located east side the property. Drainage from area F drains west onto the property before turn northeast draining off the property.

Drainage Area G is an area located northwest side the property. Drainage from Area G originates on the property where it drains northwest off the property.

Drainage Areas H, I, and J are located north side the property. Drainage from these areas mostly originates from onsite property where the drains north off the property.

Figure 2. Existing Condition



D. PROPOSED CONDITION

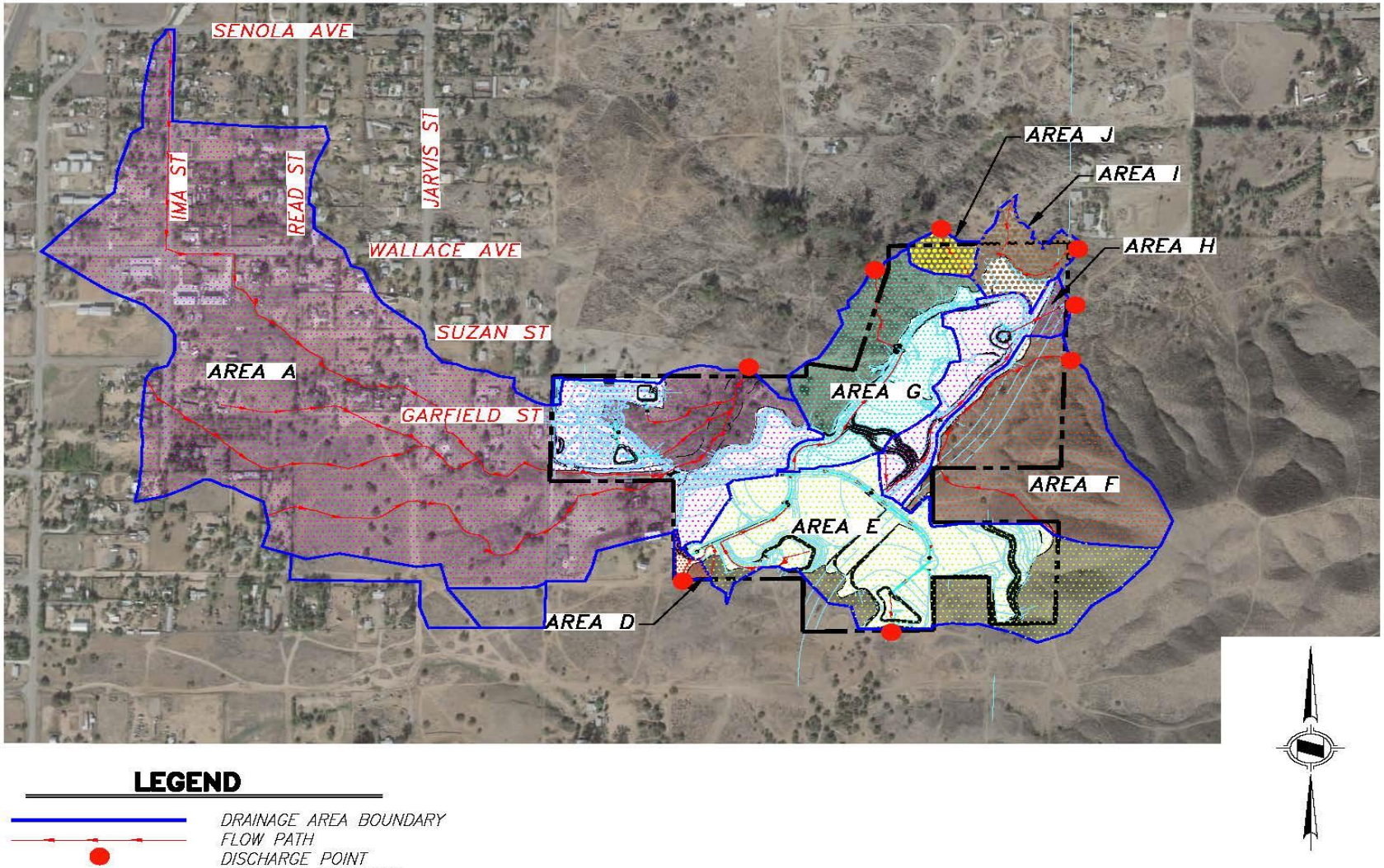
The project proposes to develop the Project Site into a cemetery with supporting facilities including a chapel, a mortuary, caretaker residence, and supporting infrastructure and utilities.

Drainage from the improved site will be collected in a series of surface drainage facilities and underground conduits. Drainage from the proposed surface drainage and storm drain facilities will either be conveyed to detention and/or water quality basin or be conveyed off-site to existing natural channels depending on mitigation requirements. First flush of all storm runoff will be treated prior to leaving the Project Site, as detailed in a separate Water Quality Management Plan report. All proposed drainage facilities on the Project Site will be privately maintained.

The proposed grading of the Project Site slightly alters the original drainage boundaries and drainage areas of the existing Project Site but does not significantly alter the original drainage patterns or runoff discharge locations. The new boundaries and grading are shown in Figure 3.

The proposed drainage systems will be designed to convey the 100-year peak flow generated on the Project Site and will be designed mitigate any increase in flow from existing conditions for the 10-year storm.

Figure 3. Proposed Condition



E. METHODOLOGY

The methodology used to for this hydrology study is based on the Riverside County Flood Control and Water Conservation District's (RCFC&WCD) Hydrology Manual dated April 1976. The hydrology and hydraulic software utilized are accepted by the RCFC&WCD which include the following:

Rational Method: Hydrology – Riverside County – Civil Design Software - Version 9.0.

Unit Hydrograph: Hydrology – Riverside County – Civil Design Software - Version 9.0.

Stream Hydraulics: HEC-RAS – U.S. Army Corps of Engineers Hydrologic Engineering Center – Version 5.0.7.

The Hydrologic Soil Groups used for this study were based on the soils information shown on the National Cooperative Soil Survey (NCSS) website provided by the Natural Resource Conservation Service. The soils map provided by the website shows that most of the area in the Project Site is classified as Hydrologic Soil Group D soil. Pockets of type Hydrologic Soil Group C soils exist at the south end of the property. A copy of the Soils Map and explanation of soil types are provided in Section 6 – References.

Existing and Proposed land use and imperviousness for the proposed Project Site and surrounding areas are based on the land use/imperviousness data provided in Plate D-5.5 and D-5.6 of the Hydrology Manual. The following table list percentage imperviousness used for the various Soil Cover Types found in the proposed project:

Table 1. Land Use and Imperviousness

Soil Cover Type	Impervious % (Ai)	Equivalent Land Use Type Per Hydrology Manual
Paved Road and Parking Lots	90%	Commercial
Burial Areas	0%	Commercial Landscaping
Graded Slopes	0%	Commercial Landscaping
Natural Ungraded Areas	0%	Undeveloped (Poor Condition)
Residential	20%	Single Family (1 Acre) lots

F. HYDROLOGIC RESULTS

RATIONAL METHOD ANALISYS

The peak flows from the 2-year, 10-year, and 100-year storms generated in the existing and proposed condition were analyzed using the Rational Method. The Rational Method Calculations for the proposed and existing condition are based on the methods outlined in Section D of the Hydrology Manual. Hydrology Maps showing the results of the Rational Method calculations for the proposed and existing conditions can be found in Section 2 – Existing Condition Hydrology Rational Method Analysis and Section 3 – Proposed Condition Hydrology Rational Method Analysis.

The results of the Rational Method calculations are summarized in the following tables:

Table 2. Summary of Rational Method Calculations Existing Condition

Drainage Area Name	Node #	Tributary Area(acres)	2-year Peak Flow (cfs)	10-year Peak Flow (cfs)	100-year Peak Flow (cfs)
A	111	119.92	44.0	122.6	220.5
D	511	1.39	1.1	2.4	4.1
E	502	30.67	14.8	38.7	67.6
F	602	26.56	14.5	35.8	61.5
G	402	17.00	9.8	23.8	41.0
H	611	4.56	2.7	6.4	10.9
I	631	4.04	2.3	5.4	9.2
J	621	1.70	1.3	3.0	5.1

Table 3. Summary of Rational Method Calculations Proposed Condition

Drainage Area Name	Node #	Tributary Area(acres)	2-year Peak Flow (cfs)	10-year Peak Flow (cfs)	100-year Peak Flow (cfs)
A	111	120.22	44.8	123.4	221.6
D	511	0.6	0.6	1.3	2.1
E	503	32.24	12.9	36.5	64.7
F	602	23.14	12.8	31.4	50.9
G	403	16.79	9.6	23.6	40.8
H	612	8.34	4.6	11.4	19.8
I	631	4.12	1.7	4.7	8.2
J	621	1.70	1.3	3.0	5.1

G. ANALYSIS OF RESULTS

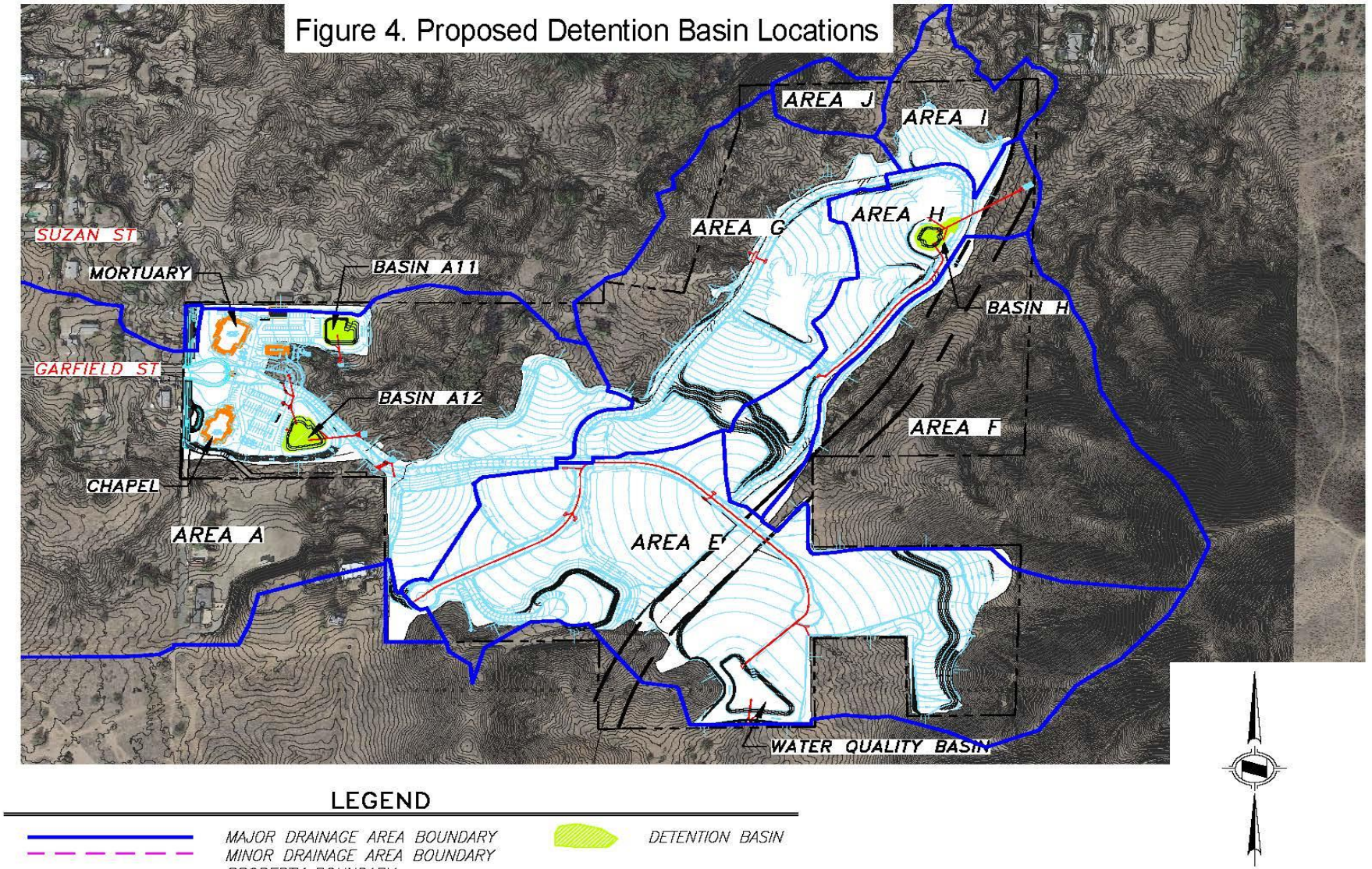
Based on the Existing Condition and Proposed Condition Rational Method results, the peak flow rates from the Proposed Conditions increased from Existing Conditions only for drainage areas A and H. The peak flow generated on the remaining drainage areas (D, E, F, G, I, and J) do not increase peak flow from Existing Conditions.

Per RCFC&WCD's Increase Runoff Criteria, any increase in flow between the existing and proposed conditions must be mitigated for all storms up to and including the 10-year storm. Basins provided for flood control mitigation must provide a volume equal to or exceeding the difference in volumes between the existing and proposed condition 100-year, 24-hr storm event.

In order to meet RCFC&WCD's Increase Runoff Criteria, the project proposes constructing three (3) detention basins: Basin A11, Basin A12, and Basin H. The proposed basin locations are shown in Figure 4:

Basin A11 is to be located east of the Mortuary Building in Drainage Area A and is on the west side of the project site. Basin A12 is to be located east of the Chapel Building in Drainage Area A and is on the west side of the project site. Basin H is to be located near the downstream end of Drainage Area H and is located on the northeast end of the project site.

Figure 4. Proposed Detention Basin Locations



Sizing of the proposed retention basins to RCFC&WCD's requirements is based on the results of a Unit Hydrograph analysis comparing the peak flow and runoff volume from existing and proposed condition drainage areas tributary to each basin based on the 10-year, 24-hr storm event.

The Unit Hydrograph Calculations for the Project Site were performed using the methods outlined in Section E of the Hydrology Manual.

Precipitation values used in the development of the unit hydrographs for the proposed and existing condition for the project site were obtained from NOAA Atlas 14, Volume 6, Version 2. Copies of the precipitation values is available in Section 6 – References.

Lag time, area average mean soil loss rate (F), minimum soil loss rate (Fm) and low loss rate (F*) where developed using procedures shown on Plate E-1.1 of the Hydrology manual and calculated within the Civil Design Software program.

The parameters as mentioned above were entered into the Civil Design Software program and following tables summarizes the results:

Table 4. Unit Hydrographs Analysis Results for Area A and Area H (10-year, 24 hr Storm)

Drainage Area Name	Incorporated Detention Basins	Condition	Tributary Area (ac)	Peak Flow (cfs)	Runoff Volume (Ac-ft)
A	A11 & A12	Existing	119.92	33.0	11.5
		Proposed	120.22	33.2	12.2
Minimum Volume of Basins Required in Drainage Area A					***0.7***
H	H	Existing	4.46	1.7	0.6
		Proposed	8.53	2.7	0.9
Minimum Volume of Basin Required in Drainage Area H					**0.3**

Supporting Unit Hydrograph calculations can be found in Section 4 – Existing Condition & Proposed Condition Hydrology Unit Hydrograph Analysis.

To meet RCFC&WCD's mitigation requirements, proposed basins must provide a minimum volume as shown in Table 4 above. The following table summarizes the actual sizes of basin provided on the Project Site:

Table 5. Proposed Detention Basin Volumes Provided

Drainage Area Name	Detention Basins	Storage Volume Provided (Ac-ft)	Minium Volume of Basins Required (Ac-ft)
A	A11	0.33	
	A12	0.47	
Net Volume Provided		***0.8***	0.7
H	H	0.33	0.3

Basin sizing calculations can be found in Section 4 – Existing Condition & Proposed Condition Hydrology Unit Hydrograph Analysis.

H. FLOOD DELINATION OF EXISTING DRAINGE SWALE

Purpose

The swale running though the project site in Drainage Area A and the proposed roadway/culvert crossing were analyzed using HEC-RAS software to determine the extent of the floorplan and to determine the performance of the proposed road/culvert crossing.

Methodology

The stretch of natural channel that transverse the project site was analyzed using HEC-RAS software. Due to the convergence of a second natural channel to the main channel within the stretch of channel being analyzed for this study, two geometric models were prepared for each channel separately with one section being shared between the two models. The model for primary jurisdictional channel is called the “Main” HEC-Ras model for this study. The model for the second natural channel that conferences with “Main” channel will be referred to as the “Secondary” Hec-Ras model.

The peak flow rates used in the “Main” and “Secondary” models are based on results of the Rational Method Hydrology for Proposed Conditions as presented on the Proposed Condition Hydrology Map proved in Section 3 of this report.

The “Main” Hec Ras model consists of 17 cross sections developed from existing and proposed topography. The location of the cross sections is shown in an exhibit in Section 5 – HEC-RAS Analysis. A manning friction factor of 0.035 was used for each section. Normal depth was used as the upstream and downstream boundaries condition for the model.

The “Main” Hec Ras Model includes two culvert crossings: An existing culvert crossing between Sections 26+10.23 and 25+80.27 and a proposed culvert as part of the proposed roadway crossing between Sections 20+11.36 and 19+38.24. The existing culvert crossing consists of two 36” RCPs that project through the roadway slope. The proposed culvert consists of a 2’ high x 14’ wide RCB structure with headwalls.

The “Secondary” Hec Ras Model consists of 6 cross sections. The downstream cross section for the “Secondary” Hec Ras Model is same section that is used in the “Main” Hec Ras model (Section 24+18.34 “Main” model = 14+21.21 “Secondary” model). A manning friction factor of 0.035 was used for each section. Normal depth was used as the upstream boundaries condition for the “Secondary” model. The water surface as calculated with the “Main” Hec Ras model was used as the downstream boundary condition for the “Secondary” model.

Due to fact that the “Main” channel is significantly higher in elevation than the Secondary Channel and the “Main” channel is significantly smaller than the Secondary Channel, Sections 24+18.34, 23+63.27, and 21+99.13 of the “Main” model includes ineffective flow areas to ensure that Hec-Ras model prioritize flow to “Main” channel over the Secondary channel when running flow through the sections.

Results.

The results of the HEC-RAS model indicate the 100-year flow will pass below the proposed roadway within the proposed culvert with approximately 0.16’ of freeboard on the upstream side of the roadway. The HEC-RAS model also indicates the 10-year flow will pass below the proposed roadway within the proposed culvert with approximately 2.3’ of freeboard on the upstream side of the roadway.

The results of this HEC-RAS analysis can be found in Section 5 – HEC-RAS Analysis

I. CONCLUSION

The proposed drainage improvements along with the three detention basin will provide adequate on-site flood protection and mitigate off-site impacts in conformance with RCFC&WCD’s criteria.

SECTION 2
EXISTING CONDITION HYDROLOGY
RATIONAL METHOD ANALYSIS

2 – YEAR RATIONAL METHOD CALCULATIONS
(ALL DRAINAGE AREAS A THROUGH AREA J)

```
                    Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
                Rational Hydrology Study        Date: 10/17/23
File:CRESCENTEX2.out
        ------------------------------------------------------------------------
        Crescent Gardens
        Existing Conditon Hydrology
        AREAS A THROUGH J
        10/17/23
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

        ------------------------------------------------------------------------


        Program License Serial Number 6406

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =    2.00 Antecedent Moisture Condition = 1

        2 year, 1 hour precipitation =  0.486(In.)
        100 year, 1 hour precipitation =  1.440(In.)

        Storm event year =   2.0
        Calculated rainfall intensity data:
        1 hour intensity =  0.486(In/Hr)
        Slope of intensity duration curve = 0.4500




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      100.000 to Point/Station      101.000
        **** INITIAL AREA EVALUATION ****
        ----------------------------------------------------------------------
        Initial area flow distance =   894.400(Ft.)
        Top (of initial area) elevation =  1694.000(Ft.)
        Bottom (of initial area) elevation =  1665.000(Ft.)
        Difference in elevation =    29.000(Ft.)
        Slope =    0.03242  s(percent)=       3.24
        TC = k(0.480)*[(length^3)/(elevation change)]^0.2
        Initial area time of concentration =   14.444 min.
        Rainfall intensity =      0.922(In/Hr) for a     2.0 year storm
        SINGLE FAMILY (1 Acre Lot)
        Runoff Coefficient = 0.265
        Decimal fraction soil group A = 1.000
        Decimal fraction soil group B = 0.000
        Decimal fraction soil group C = 0.000
        Decimal fraction soil group D = 0.000
        RI index for soil(AMC 1)  =  16.20
        Pervious area fraction =  0.800; Impervious fraction =  0.200
```

Area A

```
        Initial subarea runoff =      0.826(CFS)
        Total initial stream area =        3.380(Ac.)
        Pervious area fraction = 0.800


        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      101.000 to Point/Station      102.000
        **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
        ----------------------------------------------------------------------
        Estimated mean flow rate at midpoint of channel =      4.341(CFS)
        Depth of flow =   0.290(Ft.), Average velocity =   4.564(Ft/s)
                ******* Irregular Channel Data ***********
        ----------------------------------------------------------------------
        Information entered for subchannel number 1 :
        Point number      'X' coordinate     'Y' coordinate
                1              0.00              3.49
                2              6.98              0.00
                3             11.98              0.25
                4             23.98              0.49
        Manning's 'N' friction factor =   0.015
        ----------------------------------------------------------------------
        Sub-Channel flow  =      4.341(CFS)
          '     '         flow top width =      7.594(Ft.)
          '     '    velocity=    4.564(Ft/s)
          '     '         area =      0.951(Sq.Ft)
          '     '         Froude number =     2.273

        Upstream point elevation =  1665.000(Ft.)
        Downstream point elevation =  1638.000(Ft.)
        Flow length =   786.700(Ft.)
        Travel time  =    2.87 min.
        Time of concentration =   17.32 min.
        Depth of flow =   0.290(Ft.)
        Average velocity =   4.564(Ft/s)
        Total irregular channel flow =     4.341(CFS)
        Irregular channel normal depth above invert elev. =   0.290(Ft.)
        Average velocity of channel(s) =   4.564(Ft/s)
         Adding area flow to channel
        SINGLE FAMILY (1 Acre Lot)
        Runoff Coefficient = 0.510
        Decimal fraction soil group A = 0.000
        Decimal fraction soil group B = 0.000
        Decimal fraction soil group C = 0.000
        Decimal fraction soil group D = 1.000
        RI index for soil(AMC 1)  =  57.00
        Pervious area fraction =  0.800; Impervious fraction =  0.200
        Rainfall intensity =      0.850(In/Hr) for a     2.0 year storm
        Subarea runoff =      7.130(CFS) for     16.450(Ac.)
        Total runoff =      7.956(CFS)     Total area =      19.830(Ac.)
        Depth of flow =   0.359(Ft.), Average velocity =   4.988(Ft/s)


        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      102.000 to Point/Station      103.000
        **** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
        ----------------------------------------------------------------------
        Top of natural channel elevation =   1638.000(Ft.)
        End of natural channel elevation =   1614.000(Ft.)
        Length of natural channel  =  1328.900(Ft.)
        Estimated mean flow rate at midpoint of channel =     13.665(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0181
Corrected/adjusted channel slope =  0.0181
Travel time =    6.09 min.     TC =   23.40  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.473
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.080
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.920
RI index for soil(AMC 1)  =  59.40
Pervious area fraction =  0.860; Impervious fraction =  0.140
Rainfall intensity =      0.742(In/Hr) for a     2.0 year storm
Subarea runoff =     10.004(CFS) for     28.460(Ac.)
Total runoff =     17.959(CFS)     Total area =      48.290(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1614.000(Ft.)
Downstream point/station elevation =  1612.000(Ft.)
Pipe length  =   182.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.959(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    17.959(CFS)
Normal flow depth in pipe =   15.63(In.)
Flow top width inside pipe =   22.87(In.)
Critical Depth =   18.32(In.)
Pipe flow velocity =      8.29(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =    23.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
----------------------------------------------------------------------
Depth of flow =   1.066(Ft.), Average velocity =   3.160(Ft/s)
        ******* Irregular Channel Data ***********
----------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
----------------------------------------------------------------------
Sub-Channel flow  =     17.959(CFS)
  '     '         flow top width =     10.661(Ft.)
  '     '    velocity=    3.160(Ft/s)
  '     '         area =      5.683(Sq.Ft)
  '     '         Froude number =     0.763

Upstream point elevation =  1612.000(Ft.)
Downstream point elevation =  1611.000(Ft.)
Flow length =    76.000(Ft.)
Travel time  =    0.40 min.
Time of concentration =   24.17 min.
Depth of flow =   1.066(Ft.)
Average velocity =   3.160(Ft/s)
Total irregular channel flow =    17.959(CFS)
Irregular channel normal depth above invert elev. =   1.066(Ft.)
Average velocity of channel(s) =   3.160(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1611.000(Ft.)
Downstream point/station elevation =  1610.000(Ft.)
Pipe length  =    70.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.959(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    17.959(CFS)
Normal flow depth in pipe =   16.41(In.)
Flow top width inside pipe =   17.36(In.)
Critical Depth =   18.52(In.)
Pipe flow velocity =      8.91(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    24.30 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
----------------------------------------------------------------------
Depth of flow =   0.993(Ft.), Average velocity =   3.644(Ft/s)
        ******* Irregular Channel Data ***********
----------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
----------------------------------------------------------------------
Sub-Channel flow  =     17.959(CFS)
  '     '         flow top width =      9.928(Ft.)
  '     '    velocity=    3.644(Ft/s)
  '     '         area =      4.928(Sq.Ft)
  '     '         Froude number =     0.912

Upstream point elevation =  1610.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   285.800(Ft.)
Travel time  =    1.31 min.
Time of concentration =   25.61 min.
```

```
Depth of flow =   0.993(Ft.)
Average velocity =   3.644(Ft/s)
Total irregular channel flow =    17.959(CFS)
Irregular channel normal depth above invert elev. =   0.993(Ft.)
Average velocity of channel(s) =   3.644(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     48.290(Ac.)
Runoff from this stream =     17.959(CFS)
Time of concentration =   25.61 min.
Rainfall intensity =     0.713(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   811.600(Ft.)
Top (of initial area) elevation =  1650.000(Ft.)
Bottom (of initial area) elevation =  1631.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02341  s(percent)=       2.34
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.828 min.
Rainfall intensity =      0.912(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.522
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      3.285(CFS)
Total initial stream area =        6.900(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1631.000(Ft.)
End of natural channel elevation =   1613.000(Ft.)
Length of natural channel  =   872.300(Ft.)
Estimated mean flow rate at midpoint of channel =      5.638(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.12(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0206
Corrected/adjusted channel slope =  0.0206
Travel time =    4.66 min.     TC =   19.49  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.504
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  59.40
Pervious area fraction =  0.830; Impervious fraction =  0.170
Rainfall intensity =      0.806(In/Hr) for a     2.0 year storm
Subarea runoff =      4.011(CFS) for      9.880(Ac.)
Total runoff =      7.296(CFS)     Total area =      16.780(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.780(Ac.)
Runoff from this stream =      7.296(CFS)
Time of concentration =   19.49 min.
Rainfall intensity =     0.806(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   742.800(Ft.)
Top (of initial area) elevation =  1641.000(Ft.)
Bottom (of initial area) elevation =  1622.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02558  s(percent)=       2.56
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.061 min.
Rainfall intensity =      0.934(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.527
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      0.664(CFS)
Total initial stream area =        1.350(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
```

```
Depth of flow =   0.163(Ft.), Average velocity =   1.248(Ft/s)
        ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             60.00              0.00
        3            120.00              3.00
Manning's 'N' friction factor =   0.035
--------------------------------------------------------------------
Sub-Channel flow  =      0.664(CFS)
  '     '          flow top width =      6.524(Ft.)
  '     '    velocity=    1.248(Ft/s)
  '     '          area =      0.532(Sq.Ft)
  '     '          Froude number =     0.770

Upstream point elevation =  1622.000(Ft.)
Downstream point elevation =  1613.000(Ft.)
Flow length =   368.000(Ft.)
Travel time  =    4.92 min.
Time of concentration =   18.98 min.
Depth of flow =   0.163(Ft.)
Average velocity =   1.248(Ft/s)
Total irregular channel flow =     0.664(CFS)
Irregular channel normal depth above invert elev. =   0.163(Ft.)
Average velocity of channel(s) =   1.248(Ft/s)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Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.350(Ac.)
Runoff from this stream =      0.664(CFS)
Time of concentration =   18.98 min.
Rainfall intensity =     0.816(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        7.296     19.49                0.806
2        0.664     18.98                0.816
Largest stream flow has longer time of concentration
Qp =      7.296 + sum of
           Qb         Ia/Ib
            0.664 *    0.988 =      0.656
Qp =      7.952

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.296       0.664
Area of streams before confluence:
      16.780       1.350
Results of confluence:
Total flow rate =      7.952(CFS)
Time of concentration =    19.491 min.
Effective stream area after confluence =     18.130(Ac.)


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Process from Point/Station      202.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
--------------------------------------------------------------------
Depth of flow =   0.707(Ft.), Average velocity =   3.185(Ft/s)
        ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
--------------------------------------------------------------------
Sub-Channel flow  =      7.952(CFS)
  '     '          flow top width =      7.066(Ft.)
  '     '    velocity=    3.185(Ft/s)
  '     '          area =      2.497(Sq.Ft)
  '     '          Froude number =     0.944

Upstream point elevation =  1613.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   367.500(Ft.)
Travel time  =    1.92 min.
Time of concentration =   21.41 min.
Depth of flow =   0.707(Ft.)
Average velocity =   3.185(Ft/s)
Total irregular channel flow =     7.952(CFS)
Irregular channel normal depth above invert elev. =   0.707(Ft.)
Average velocity of channel(s) =   3.185(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
--------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.130(Ac.)
Runoff from this stream =      7.952(CFS)
Time of concentration =   21.41 min.
Rainfall intensity =     0.773(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       17.959     25.61           0.713
2        7.952     21.41           0.773
Largest stream flow has longer time of concentration
Qp =     17.959 + sum of
           Qb         Ia/Ib
            7.952 *    0.923 =      7.337
Qp =     25.296

Total of 2 main streams to confluence:
Flow rates before confluence point:
```

```
      17.959       7.952
Area of streams before confluence:
       48.290       18.130


Results of confluence:
Total flow rate =     25.296(CFS)
Time of concentration =    25.610 min.
Effective stream area after confluence  =     66.420(Ac.)


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Process from Point/Station      107.000 to Point/Station      108.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1604.500(Ft.)
End of natural channel elevation =   1600.000(Ft.)
Length of natural channel  =   465.800(Ft.)
Estimated mean flow rate at midpoint of channel =     27.684(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.22(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    2.41 min.     TC =   28.02  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.426
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 1)  =  56.64
Pervious area fraction =  0.880; Impervious fraction =  0.120
Rainfall intensity =      0.685(In/Hr) for a     2.0 year storm
Subarea runoff =      3.657(CFS) for     12.540(Ac.)
Total runoff =     28.953(CFS)     Total area =      78.960(Ac.)


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Process from Point/Station      108.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1600.000(Ft.)
Downstream point/station elevation =  1599.000(Ft.)
Pipe length  =    52.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.953(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    28.953(CFS)
Normal flow depth in pipe =   18.28(In.)
Flow top width inside pipe =   20.45(In.)
Critical Depth =   22.14(In.)
Pipe flow velocity =     11.26(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    28.10 min.


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Process from Point/Station      109.000 to Point/Station      110.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
----------------------------------------------------------------------
Depth of flow =   1.158(Ft.), Average velocity =   4.316(Ft/s)
       ******* Irregular Channel Data ***********
----------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
----------------------------------------------------------------------
Sub-Channel flow  =     28.953(CFS)
  '     '         flow top width =     11.583(Ft.)
  '     '    velocity=    4.316(Ft/s)
  '     '         area =      6.708(Sq.Ft)
  '     '         Froude number =     1.000

Upstream point elevation =  1599.000(Ft.)
Downstream point elevation =  1586.000(Ft.)
Flow length =   591.500(Ft.)
Travel time  =    2.28 min.
Time of concentration =   30.38 min.
Depth of flow =   1.158(Ft.)
Average velocity =   4.316(Ft/s)
Total irregular channel flow =    28.953(CFS)
Irregular channel normal depth above invert elev. =   1.158(Ft.)
Average velocity of channel(s) =   4.316(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     78.960(Ac.)
Runoff from this stream =     28.953(CFS)
Time of concentration =   30.38 min.
Rainfall intensity =     0.660(In/Hr)


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Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   527.800(Ft.)
Top (of initial area) elevation =  1635.000(Ft.)
Bottom (of initial area) elevation =  1623.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.02274  s(percent)=       2.27
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.865 min.
Rainfall intensity =      0.940(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.626
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.587(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      301.000 to Point/Station      302.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1623.000(Ft.)
End of natural channel elevation =   1608.000(Ft.)
Length of natural channel  =   715.100(Ft.)
Estimated mean flow rate at midpoint of channel =      3.445(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0210
Corrected/adjusted channel slope =  0.0210
Travel time =    4.25 min.     TC =   18.11  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.602
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.833(In/Hr) for a     2.0 year storm
Subarea runoff =      3.171(CFS) for      6.320(Ac.)
Total runoff =      4.758(CFS)     Total area =       9.020(Ac.)


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Process from Point/Station      302.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1608.000(Ft.)
End of natural channel elevation =   1586.000(Ft.)
Length of natural channel  =  1275.000(Ft.)
Estimated mean flow rate at midpoint of channel =      9.161(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0173
Corrected/adjusted channel slope =  0.0173
Travel time =    6.62 min.     TC =   24.73  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.485
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.210
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.790
RI index for soil(AMC 1)  =  64.68
Pervious area fraction =  0.920; Impervious fraction =  0.080
Rainfall intensity =      0.724(In/Hr) for a     2.0 year storm
Subarea runoff =      5.860(CFS) for     16.690(Ac.)
Total runoff =     10.619(CFS)     Total area =      25.710(Ac.)


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Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     25.710(Ac.)
Runoff from this stream =     10.619(CFS)
Time of concentration =   24.73 min.
Rainfall intensity =     0.724(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       28.953     30.38                 0.660
2       10.619     24.73                 0.724
Largest stream flow has longer time of concentration
Qp =     28.953 + sum of
           Qb         Ia/Ib
           10.619 *    0.912 =      9.680
Qp =     38.633

Total of 2 streams to confluence:
Flow rates before confluence point:
      28.953      10.619
Area of streams before confluence:
       78.960       25.710
Results of confluence:
Total flow rate =     38.633(CFS)
Time of concentration =    30.383 min.
Effective stream area after confluence =    104.670(Ac.)


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Process from Point/Station      110.000 to Point/Station      111.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
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Top of natural channel elevation =   1586.000(Ft.)
End of natural channel elevation =   1562.200(Ft.)
Length of natural channel  =   769.100(Ft.)
Estimated mean flow rate at midpoint of channel =     41.447(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.45(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0309
Corrected/adjusted channel slope =  0.0309
Travel time =    1.99 min.     TC =   32.37  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.548
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.642(In/Hr) for a     2.0 year storm
Subarea runoff =      5.363(CFS) for     15.250(Ac.)
Total runoff =     43.995(CFS)     Total area =     119.920(Ac.)


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Process from Point/Station      310.000 to Point/Station      311.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   545.200(Ft.)
Top (of initial area) elevation =  1642.000(Ft.)
Bottom (of initial area) elevation =  1621.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.03852  s(percent)=       3.85
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.641 min.
Rainfall intensity =      0.980(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.634
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.999(CFS)
Total initial stream area =        1.610(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      311.000 to Point/Station      312.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
```

Area A

Area B

```
Top of natural channel elevation =   1621.000(Ft.)
End of natural channel elevation =   1607.000(Ft.)
Length of natural channel  =   534.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.620(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.67(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0262
Corrected/adjusted channel slope =  0.0262
Travel time =    3.34 min.     TC =   15.98  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.465
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.770
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.230
RI index for soil(AMC 1)  =  61.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.882(In/Hr) for a     2.0 year storm
Subarea runoff =      0.820(CFS) for      2.000(Ac.)
Total runoff =      1.819(CFS)     Total area =       3.610(Ac.)


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Process from Point/Station      320.000 to Point/Station      321.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   543.400(Ft.)
Top (of initial area) elevation =  1613.000(Ft.)
Bottom (of initial area) elevation =  1604.000(Ft.)
Difference in elevation =     9.000(Ft.)
Slope =    0.01656  s(percent)=       1.66
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.945 min.
Rainfall intensity =      0.908(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.481
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.160
RI index for soil(AMC 1)  =  62.71
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.008(CFS)
Total initial stream area =        2.310(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      510.000 to Point/Station      511.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
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Area C

```
Initial area flow distance =   268.700(Ft.)
Top (of initial area) elevation =  1630.500(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    16.500(Ft.)
Slope =    0.06141  s(percent)=       6.14
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.676 min.
Rainfall intensity =      1.160(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.664
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.071(CFS)
Total initial stream area =        1.390(Ac.)
Pervious area fraction = 1.000
```

Area D

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   658.400(Ft.)
Top (of initial area) elevation =  1653.000(Ft.)
Bottom (of initial area) elevation =  1605.000(Ft.)
Difference in elevation =    48.000(Ft.)
Slope =    0.07290  s(percent)=       7.29
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.998 min.
Rainfall intensity =      1.003(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.638
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.175(CFS)
Total initial stream area =        3.400(Ac.)
Pervious area fraction = 1.000
```

Area E

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1605.000(Ft.)
End of natural channel elevation =   1576.000(Ft.)
Length of natural channel  =  1342.600(Ft.)
Estimated mean flow rate at midpoint of channel =     10.898(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.75(Ft/s)
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0216
Corrected/adjusted channel slope =  0.0216
Travel time =    5.96 min.     TC =   17.96  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.551
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.836(In/Hr) for a     2.0 year storm
Subarea runoff =     12.575(CFS) for     27.270(Ac.)
Total runoff =     14.750(CFS)     Total area =      30.670(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   456.800(Ft.)
Top (of initial area) elevation =  1598.000(Ft.)
Bottom (of initial area) elevation =  1566.000(Ft.)
Difference in elevation =    32.000(Ft.)
Slope =    0.07005  s(percent)=       7.01
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.449 min.
Rainfall intensity =      1.067(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.649
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.836(CFS)
Total initial stream area =        2.650(Ac.)
Pervious area fraction = 1.000
```

Area G

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1566.000(Ft.)
End of natural channel elevation =   1544.500(Ft.)
Length of natural channel  =   997.100(Ft.)
Estimated mean flow rate at midpoint of channel =      6.805(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.34(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0216
Corrected/adjusted channel slope =  0.0216
Travel time =    4.98 min.     TC =   15.43  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.616
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.895(In/Hr) for a     2.0 year storm
Subarea runoff =      7.915(CFS) for     14.340(Ac.)
Total runoff =      9.751(CFS)     Total area =      16.990(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   850.600(Ft.)
Top (of initial area) elevation =  1665.000(Ft.)
Bottom (of initial area) elevation =  1575.000(Ft.)
Difference in elevation =    90.000(Ft.)
Slope =    0.10581  s(percent)=      10.58
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.339 min.
Rainfall intensity =      0.990(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.633
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.060
Decimal fraction soil group D = 0.940
RI index for soil(AMC 1)  =  76.11
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.318(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1575.000(Ft.)
End of natural channel elevation =   1540.000(Ft.)
Length of natural channel  =  1005.700(Ft.)
Estimated mean flow rate at midpoint of channel =      9.478(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.60(Ft/s)
```

Area F

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0348
Corrected/adjusted channel slope =  0.0348
Travel time =    3.64 min.     TC =   15.98  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.608
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 1)  =  75.92
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.881(In/Hr) for a     2.0 year storm
Subarea runoff =     12.254(CFS) for     22.860(Ac.)
Total runoff =     14.572(CFS)     Total area =      26.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      611.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   680.600(Ft.)
Top (of initial area) elevation =  1570.000(Ft.)
Bottom (of initial area) elevation =  1541.000(Ft.)
Difference in elevation =    29.000(Ft.)
Slope =    0.04261  s(percent)=       4.26
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.537 min.
Rainfall intensity =      0.950(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.628
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.719(CFS)
Total initial stream area =        4.560(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      631.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   881.300(Ft.)
Top (of initial area) elevation =  1576.000(Ft.)
Bottom (of initial area) elevation =  1540.000(Ft.)
Difference in elevation =    36.000(Ft.)
Slope =    0.04085  s(percent)=       4.08
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.139 min.
Rainfall intensity =      0.903(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.618
```

Area H

Area I

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.255(CFS)
Total initial stream area =        4.040(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      621.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   325.800(Ft.)
Top (of initial area) elevation =  1571.000(Ft.)
Bottom (of initial area) elevation =  1537.000(Ft.)
Difference in elevation =    34.000(Ft.)
Slope =    0.10436  s(percent)=      10.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.429 min.
Rainfall intensity =      1.175(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.666
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.332(CFS)
Total initial stream area =        1.700(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =          211.75 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.933
Area averaged RI index number =  82.2
```

Area J

10 – YEAR RATIONAL METHOD CALCULATIONS
(ALL DRAINAGE AREAS A THROUGH AREA J)

```
                    Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
                Rational Hydrology Study        Date: 10/17/23
File:CRESCENTEX10.out
        ------------------------------------------------------------------------
        Crescent Gardens
        Existing Conditon Hydrology
        AREAS A THROUGH J
        10/17/23
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

        ------------------------------------------------------------------------


        Program License Serial Number 6406

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =   10.00 Antecedent Moisture Condition = 2

        2 year, 1 hour precipitation =  0.486(In.)
        100 year, 1 hour precipitation =  1.440(In.)

        Storm event year =  10.0
        Calculated rainfall intensity data:
        1 hour intensity =  0.878(In/Hr)
        Slope of intensity duration curve = 0.4500




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      100.000 to Point/Station      101.000
        **** INITIAL AREA EVALUATION ****
        ______________________________________________________________________
        Initial area flow distance =   894.400(Ft.)
        Top (of initial area) elevation =  1694.000(Ft.)
        Bottom (of initial area) elevation =  1665.000(Ft.)
        Difference in elevation =    29.000(Ft.)
        Slope =    0.03242  s(percent)=       3.24
        TC = k(0.480)*[(length^3)/(elevation change)]^0.2
        Initial area time of concentration =   14.444 min.
        Rainfall intensity =      1.667(In/Hr) for a    10.0 year storm
        SINGLE FAMILY (1 Acre Lot)
        Runoff Coefficient = 0.447
        Decimal fraction soil group A = 1.000
        Decimal fraction soil group B = 0.000
        Decimal fraction soil group C = 0.000
        Decimal fraction soil group D = 0.000
        RI index for soil(AMC 2)  =  32.00
        Pervious area fraction =  0.800; Impervious fraction =  0.200
```

Area A

```
        Initial subarea runoff =      2.518(CFS)
        Total initial stream area =        3.380(Ac.)
        Pervious area fraction = 0.800


        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      101.000 to Point/Station      102.000
        **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
        ______________________________________________________________________
        Estimated mean flow rate at midpoint of channel =     11.953(CFS)
        Depth of flow =   0.408(Ft.), Average velocity =   5.404(Ft/s)
                ******* Irregular Channel Data ***********
        ------------------------------------------------------------------
        Information entered for subchannel number 1 :
        Point number      'X' coordinate     'Y' coordinate
                1              0.00              3.49
                2              6.98              0.00
                3             11.98              0.25
                4             23.98              0.49
        Manning's 'N' friction factor =   0.015
        ------------------------------------------------------------------
        Sub-Channel flow  =     11.953(CFS)
          '     '         flow top width =     13.740(Ft.)
          '     '    velocity=    5.404(Ft/s)
          '     '         area =      2.212(Sq.Ft)
          '     '         Froude number =     2.373

        Upstream point elevation =  1665.000(Ft.)
        Downstream point elevation =  1638.000(Ft.)
        Flow length =   786.700(Ft.)
        Travel time  =    2.43 min.
        Time of concentration =   16.87 min.
        Depth of flow =   0.408(Ft.)
        Average velocity =   5.404(Ft/s)
        Total irregular channel flow =    11.953(CFS)
        Irregular channel normal depth above invert elev. =   0.408(Ft.)
        Average velocity of channel(s) =   5.404(Ft/s)
         Adding area flow to channel
        SINGLE FAMILY (1 Acre Lot)
        Runoff Coefficient = 0.740
        Decimal fraction soil group A = 0.000
        Decimal fraction soil group B = 0.000
        Decimal fraction soil group C = 0.000
        Decimal fraction soil group D = 1.000
        RI index for soil(AMC 2)  =  75.00
        Pervious area fraction =  0.800; Impervious fraction =  0.200
        Rainfall intensity =      1.555(In/Hr) for a    10.0 year storm
        Subarea runoff =     18.926(CFS) for     16.450(Ac.)
        Total runoff =     21.444(CFS)     Total area =      19.830(Ac.)
        Depth of flow =   0.489(Ft.), Average velocity =   6.137(Ft/s)


        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      102.000 to Point/Station      103.000
        **** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
        ______________________________________________________________________
        Top of natural channel elevation =   1638.000(Ft.)
        End of natural channel elevation =   1614.000(Ft.)
        Length of natural channel  =  1328.900(Ft.)
        Estimated mean flow rate at midpoint of channel =     36.832(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.77(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0181
Corrected/adjusted channel slope =  0.0181
Travel time =    4.65 min.     TC =   21.52  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.728
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.080
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.920
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.860; Impervious fraction =  0.140
Rainfall intensity =      1.394(In/Hr) for a    10.0 year storm
Subarea runoff =     28.874(CFS) for     28.460(Ac.)
Total runoff =     50.318(CFS)     Total area =      48.290(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1614.000(Ft.)
Downstream point/station elevation =  1612.000(Ft.)
Pipe length  =   182.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.318(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    50.318(CFS)
Normal flow depth in pipe =   24.70(In.)
Flow top width inside pipe =   28.63(In.)
Critical Depth =   28.00(In.)
Pipe flow velocity =     10.56(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =    21.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.569(Ft.), Average velocity =   4.089(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     50.318(CFS)
  '     '         flow top width =     15.689(Ft.)
  '     '    velocity=    4.089(Ft/s)
  '     '         area =     12.307(Sq.Ft)
  '     '         Froude number =     0.814

Upstream point elevation =  1612.000(Ft.)
Downstream point elevation =  1611.000(Ft.)
Flow length =    76.000(Ft.)
Travel time  =    0.31 min.
Time of concentration =   22.11 min.
Depth of flow =   1.569(Ft.)
Average velocity =   4.089(Ft/s)
Total irregular channel flow =    50.318(CFS)
Irregular channel normal depth above invert elev. =   1.569(Ft.)
Average velocity of channel(s) =   4.089(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1611.000(Ft.)
Downstream point/station elevation =  1610.000(Ft.)
Pipe length  =    70.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.318(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    50.318(CFS)
Normal flow depth in pipe =   25.59(In.)
Flow top width inside pipe =   21.24(In.)
Critical Depth =   27.63(In.)
Pipe flow velocity =     11.28(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    22.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.461(Ft.), Average velocity =   4.715(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     50.318(CFS)
  '     '         flow top width =     14.609(Ft.)
  '     '    velocity=    4.715(Ft/s)
  '     '         area =     10.672(Sq.Ft)
  '     '         Froude number =     0.972

Upstream point elevation =  1610.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   285.800(Ft.)
Travel time  =    1.01 min.
Time of concentration =   23.23 min.
```

```
Depth of flow =   1.461(Ft.)
Average velocity =   4.715(Ft/s)
Total irregular channel flow =    50.318(CFS)
Irregular channel normal depth above invert elev. =   1.461(Ft.)
Average velocity of channel(s) =   4.715(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     48.290(Ac.)
Runoff from this stream =     50.318(CFS)
Time of concentration =   23.23 min.
Rainfall intensity =     1.346(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   811.600(Ft.)
Top (of initial area) elevation =  1650.000(Ft.)
Bottom (of initial area) elevation =  1631.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02341  s(percent)=       2.34
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.828 min.
Rainfall intensity =      1.648(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.747
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      8.494(CFS)
Total initial stream area =        6.900(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1631.000(Ft.)
End of natural channel elevation =   1613.000(Ft.)
Length of natural channel  =   872.300(Ft.)
Estimated mean flow rate at midpoint of channel =     14.575(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.96(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0206
Corrected/adjusted channel slope =  0.0206
Travel time =    3.67 min.     TC =   18.50  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.830; Impervious fraction =  0.170
Rainfall intensity =      1.492(In/Hr) for a    10.0 year storm
Subarea runoff =     10.943(CFS) for      9.880(Ac.)
Total runoff =     19.437(CFS)     Total area =      16.780(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.780(Ac.)
Runoff from this stream =     19.437(CFS)
Time of concentration =   18.50 min.
Rainfall intensity =     1.492(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   742.800(Ft.)
Top (of initial area) elevation =  1641.000(Ft.)
Bottom (of initial area) elevation =  1622.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02558  s(percent)=       2.56
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.061 min.
Rainfall intensity =      1.688(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.750
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      1.709(CFS)
Total initial stream area =        1.350(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
```

```
Depth of flow =   0.233(Ft.), Average velocity =   1.580(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             60.00              0.00
        3            120.00              3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =      1.709(CFS)
  '     '          flow top width =      9.300(Ft.)
  '     '    velocity=    1.580(Ft/s)
  '     '          area =      1.081(Sq.Ft)
  '     '          Froude number =     0.817

Upstream point elevation =  1622.000(Ft.)
Downstream point elevation =  1613.000(Ft.)
Flow length =   368.000(Ft.)
Travel time  =    3.88 min.
Time of concentration =   17.94 min.
Depth of flow =   0.233(Ft.)
Average velocity =   1.580(Ft/s)
Total irregular channel flow =     1.709(CFS)
Irregular channel normal depth above invert elev. =   0.233(Ft.)
Average velocity of channel(s) =   1.580(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.350(Ac.)
Runoff from this stream =      1.709(CFS)
Time of concentration =   17.94 min.
Rainfall intensity =     1.512(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       19.437     18.50                1.492
2        1.709     17.94                1.512
Largest stream flow has longer time of concentration
Qp =     19.437 + sum of
           Qb         Ia/Ib
            1.709 *    0.986 =      1.685
Qp =     21.122

Total of 2 streams to confluence:
Flow rates before confluence point:
      19.437       1.709
Area of streams before confluence:
       16.780        1.350
Results of confluence:
Total flow rate =     21.122(CFS)
Time of concentration =    18.503 min.
Effective stream area after confluence =     18.130(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Depth of flow =   1.019(Ft.), Average velocity =   4.066(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     21.122(CFS)
  '     '          flow top width =     10.193(Ft.)
  '     '    velocity=    4.066(Ft/s)
  '     '          area =      5.195(Sq.Ft)
  '     '          Froude number =     1.004

Upstream point elevation =  1613.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   367.500(Ft.)
Travel time  =    1.51 min.
Time of concentration =   20.01 min.
Depth of flow =   1.019(Ft.)
Average velocity =   4.066(Ft/s)
Total irregular channel flow =    21.122(CFS)
Irregular channel normal depth above invert elev. =   1.019(Ft.)
Average velocity of channel(s) =   4.066(Ft/s)


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Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.130(Ac.)
Runoff from this stream =     21.122(CFS)
Time of concentration =   20.01 min.
Rainfall intensity =     1.440(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       50.318     23.23           1.346
2       21.122     20.01           1.440
Largest stream flow has longer time of concentration
Qp =     50.318 + sum of
           Qb         Ia/Ib
           21.122 *    0.935 =     19.750
Qp =     70.068

Total of 2 main streams to confluence:
Flow rates before confluence point:
```

```
      50.318      21.122
Area of streams before confluence:
       48.290       18.130


Results of confluence:
Total flow rate =     70.068(CFS)
Time of concentration =    23.229 min.
Effective stream area after confluence  =     66.420(Ac.)


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Process from Point/Station      107.000 to Point/Station      108.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1604.500(Ft.)
End of natural channel elevation =   1600.000(Ft.)
Length of natural channel  =   465.800(Ft.)
Estimated mean flow rate at midpoint of channel =     76.683(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.31(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    1.80 min.     TC =   25.03  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.696
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  74.70
Pervious area fraction =  0.880; Impervious fraction =  0.120
Rainfall intensity =      1.302(In/Hr) for a    10.0 year storm
Subarea runoff =     11.364(CFS) for     12.540(Ac.)
Total runoff =     81.432(CFS)     Total area =      78.960(Ac.)


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Process from Point/Station      108.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1600.000(Ft.)
Downstream point/station elevation =  1599.000(Ft.)
Pipe length  =    52.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    81.432(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    81.432(CFS)
Normal flow depth in pipe =   26.34(In.)
Flow top width inside pipe =   31.90(In.)
Critical Depth =   33.38(In.)
Pipe flow velocity =     14.68(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    25.09 min.


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Process from Point/Station      109.000 to Point/Station      110.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.707(Ft.), Average velocity =   5.590(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     81.432(CFS)
  '     '         flow top width =     17.069(Ft.)
  '     '    velocity=    5.590(Ft/s)
  '     '         area =     14.568(Sq.Ft)
  '     '         Froude number =     1.066

Upstream point elevation =  1599.000(Ft.)
Downstream point elevation =  1586.000(Ft.)
Flow length =   591.500(Ft.)
Travel time  =    1.76 min.
Time of concentration =   26.85 min.
Depth of flow =   1.707(Ft.)
Average velocity =   5.590(Ft/s)
Total irregular channel flow =    81.432(CFS)
Irregular channel normal depth above invert elev. =   1.707(Ft.)
Average velocity of channel(s) =   5.590(Ft/s)


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Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     78.960(Ac.)
Runoff from this stream =     81.432(CFS)
Time of concentration =   26.85 min.
Rainfall intensity =     1.261(In/Hr)


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Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   527.800(Ft.)
Top (of initial area) elevation =  1635.000(Ft.)
Bottom (of initial area) elevation =  1623.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.02274  s(percent)=       2.27
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.865 min.
Rainfall intensity =      1.698(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.762(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      301.000 to Point/Station      302.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1623.000(Ft.)
End of natural channel elevation =   1608.000(Ft.)
Length of natural channel  =   715.100(Ft.)
Estimated mean flow rate at midpoint of channel =      8.165(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.44(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0210
Corrected/adjusted channel slope =  0.0210
Travel time =    3.46 min.     TC =   17.33  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.536(In/Hr) for a    10.0 year storm
Subarea runoff =      7.891(CFS) for      6.320(Ac.)
Total runoff =     11.653(CFS)     Total area =       9.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1608.000(Ft.)
End of natural channel elevation =   1586.000(Ft.)
Length of natural channel  =  1275.000(Ft.)
Estimated mean flow rate at midpoint of channel =     22.435(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.06(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0173
Corrected/adjusted channel slope =  0.0173
Travel time =    5.23 min.     TC =   22.56  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.747
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.210
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.790
RI index for soil(AMC 2)  =  81.20
Pervious area fraction =  0.920; Impervious fraction =  0.080
Rainfall intensity =      1.364(In/Hr) for a    10.0 year storm
Subarea runoff =     17.013(CFS) for     16.690(Ac.)
Total runoff =     28.666(CFS)     Total area =      25.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     25.710(Ac.)
Runoff from this stream =     28.666(CFS)
Time of concentration =   22.56 min.
Rainfall intensity =     1.364(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1       81.432     26.85                  1.261
2       28.666     22.56                  1.364
Largest stream flow has longer time of concentration
Qp =     81.432 + sum of
           Qb         Ia/Ib
           28.666 *    0.925 =     26.506
Qp =    107.938

Total of 2 streams to confluence:
Flow rates before confluence point:
      81.432      28.666
Area of streams before confluence:
       78.960       25.710
Results of confluence:
Total flow rate =    107.938(CFS)
Time of concentration =    26.854 min.
Effective stream area after confluence =    104.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      111.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
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Top of natural channel elevation =   1586.000(Ft.)
End of natural channel elevation =   1562.200(Ft.)
Length of natural channel  =   769.100(Ft.)
Estimated mean flow rate at midpoint of channel =    115.801(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.73(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0309
Corrected/adjusted channel slope =  0.0309
Travel time =    1.47 min.     TC =   28.32  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.794
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.232(In/Hr) for a    10.0 year storm
Subarea runoff =     14.908(CFS) for     15.250(Ac.)
Total runoff =    122.846(CFS)     Total area =     119.920(Ac.)


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Process from Point/Station      310.000 to Point/Station      311.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   545.200(Ft.)
Top (of initial area) elevation =  1642.000(Ft.)
Bottom (of initial area) elevation =  1621.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.03852  s(percent)=       3.85
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.641 min.
Rainfall intensity =      1.771(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.347(CFS)
Total initial stream area =        1.610(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      312.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
```

Area A

Area B

```
Top of natural channel elevation =   1621.000(Ft.)
End of natural channel elevation =   1607.000(Ft.)
Length of natural channel  =   534.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.805(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0262
Corrected/adjusted channel slope =  0.0262
Travel time =    2.78 min.     TC =   15.42  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.738
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.770
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.230
RI index for soil(AMC 2)  =  79.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.619(In/Hr) for a    10.0 year storm
Subarea runoff =      2.391(CFS) for      2.000(Ac.)
Total runoff =      4.738(CFS)     Total area =       3.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   543.400(Ft.)
Top (of initial area) elevation =  1613.000(Ft.)
Bottom (of initial area) elevation =  1604.000(Ft.)
Difference in elevation =     9.000(Ft.)
Slope =    0.01656  s(percent)=       1.66
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.945 min.
Rainfall intensity =      1.642(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.746
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.160
RI index for soil(AMC 2)  =  79.76
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.831(CFS)
Total initial stream area =        2.310(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      511.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
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Area C

```
Initial area flow distance =   268.700(Ft.)
Top (of initial area) elevation =  1630.500(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    16.500(Ft.)
Slope =    0.06141  s(percent)=       6.14
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.676 min.
Rainfall intensity =      2.097(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.433(CFS)
Total initial stream area =        1.390(Ac.)
Pervious area fraction = 1.000
```

Area D

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   658.400(Ft.)
Top (of initial area) elevation =  1653.000(Ft.)
Bottom (of initial area) elevation =  1605.000(Ft.)
Difference in elevation =    48.000(Ft.)
Slope =    0.07290  s(percent)=       7.29
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.998 min.
Rainfall intensity =      1.813(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.084(CFS)
Total initial stream area =        3.400(Ac.)
Pervious area fraction = 1.000
```

Area E

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1605.000(Ft.)
End of natural channel elevation =   1576.000(Ft.)
Length of natural channel  =  1342.600(Ft.)
Estimated mean flow rate at midpoint of channel =     25.474(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.70(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0216
Corrected/adjusted channel slope =  0.0216
Travel time =    4.76 min.     TC =   16.76  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.790
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.560(In/Hr) for a    10.0 year storm
Subarea runoff =     33.602(CFS) for     27.270(Ac.)
Total runoff =     38.687(CFS)     Total area =      30.670(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   456.800(Ft.)
Top (of initial area) elevation =  1598.000(Ft.)
Bottom (of initial area) elevation =  1566.000(Ft.)
Difference in elevation =    32.000(Ft.)
Slope =    0.07005  s(percent)=       7.01
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.449 min.
Rainfall intensity =      1.929(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.238(CFS)
Total initial stream area =        2.650(Ac.)
Pervious area fraction = 1.000
```

Area G

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1566.000(Ft.)
End of natural channel elevation =   1544.500(Ft.)
Length of natural channel  =   997.100(Ft.)
Estimated mean flow rate at midpoint of channel =     15.706(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.12(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0216
Corrected/adjusted channel slope =  0.0216
Travel time =    4.03 min.     TC =   14.48  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.666(In/Hr) for a    10.0 year storm
Subarea runoff =     19.562(CFS) for     14.340(Ac.)
Total runoff =     23.800(CFS)     Total area =      16.990(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   850.600(Ft.)
Top (of initial area) elevation =  1665.000(Ft.)
Bottom (of initial area) elevation =  1575.000(Ft.)
Difference in elevation =    90.000(Ft.)
Slope =    0.10581  s(percent)=      10.58
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.339 min.
Rainfall intensity =      1.790(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.060
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2)  =  88.82
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.449(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1575.000(Ft.)
End of natural channel elevation =   1540.000(Ft.)
Length of natural channel  =  1005.700(Ft.)
Estimated mean flow rate at midpoint of channel =     22.284(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.76(Ft/s)
```

Area F

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0348
Corrected/adjusted channel slope =  0.0348
Travel time =    2.91 min.     TC =   15.25  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  88.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.627(In/Hr) for a    10.0 year storm
Subarea runoff =     30.312(CFS) for     22.860(Ac.)
Total runoff =     35.762(CFS)     Total area =      26.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      611.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   680.600(Ft.)
Top (of initial area) elevation =  1570.000(Ft.)
Bottom (of initial area) elevation =  1541.000(Ft.)
Difference in elevation =    29.000(Ft.)
Slope =    0.04261  s(percent)=       4.26
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.537 min.
Rainfall intensity =      1.717(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.429(CFS)
Total initial stream area =        4.560(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      631.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   881.300(Ft.)
Top (of initial area) elevation =  1576.000(Ft.)
Bottom (of initial area) elevation =  1540.000(Ft.)
Difference in elevation =    36.000(Ft.)
Slope =    0.04085  s(percent)=       4.08
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.139 min.
Rainfall intensity =      1.633(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
```

Area H

Area I

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.392(CFS)
Total initial stream area =        4.040(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      621.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   325.800(Ft.)
Top (of initial area) elevation =  1571.000(Ft.)
Bottom (of initial area) elevation =  1537.000(Ft.)
Difference in elevation =    34.000(Ft.)
Slope =    0.10436  s(percent)=      10.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.429 min.
Rainfall intensity =      2.125(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.017(CFS)
Total initial stream area =        1.700(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =          211.75 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.933
Area averaged RI index number =  82.2
```

Area J

100 – YEAR RATIONAL METHOD CALCULATIONS
(ALL DRAINAGE AREAS A THROUGH AREA J)

```
                    Riverside County Rational Hydrology Program

        CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
                Rational Hydrology Study        Date: 10/17/23
File:CRESCENTEX100.out
        ------------------------------------------------------------------------
        Crescent Gardens
        Existing Conditon Hydrology
        AREAS A THROUGH J
        10/17/23
        ------------------------------------------------------------------------
         *********   Hydrology Study Control Information **********

         English (in-lb) Units used in input data file

        ------------------------------------------------------------------------


        Program License Serial Number 6406

        ------------------------------------------------------------------------
        Rational Method Hydrology Program based on
        Riverside County Flood Control & Water Conservation District
        1978 hydrology manual

        Storm event (year) =  100.00 Antecedent Moisture Condition = 2

        2 year, 1 hour precipitation =  0.486(In.)
        100 year, 1 hour precipitation =  1.440(In.)

        Storm event year = 100.0
        Calculated rainfall intensity data:
        1 hour intensity =  1.440(In/Hr)
        Slope of intensity duration curve = 0.4500




        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      100.000 to Point/Station      101.000
        **** INITIAL AREA EVALUATION ****
        ________________________________________________________________________
        Initial area flow distance =   894.400(Ft.)
        Top (of initial area) elevation =  1694.000(Ft.)
        Bottom (of initial area) elevation =  1665.000(Ft.)
        Difference in elevation =    29.000(Ft.)
        Slope =    0.03242  s(percent)=       3.24
        TC = k(0.480)*[(length^3)/(elevation change)]^0.2
        Initial area time of concentration =   14.444 min.
        Rainfall intensity =      2.733(In/Hr) for a   100.0 year storm
        SINGLE FAMILY (1 Acre Lot)
        Runoff Coefficient = 0.534
        Decimal fraction soil group A = 1.000
        Decimal fraction soil group B = 0.000
        Decimal fraction soil group C = 0.000
        Decimal fraction soil group D = 0.000
        RI index for soil(AMC 2)  =  32.00
        Pervious area fraction =  0.800; Impervious fraction =  0.200
```

Area A

```
        Initial subarea runoff =      4.929(CFS)
        Total initial stream area =        3.380(Ac.)
        Pervious area fraction = 0.800


        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      101.000 to Point/Station      102.000
        **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
        ________________________________________________________________________
        Estimated mean flow rate at midpoint of channel =     21.663(CFS)
        Depth of flow =   0.491(Ft.), Average velocity =   6.157(Ft/s)
                ******* Irregular Channel Data ***********
        ------------------------------------------------------------------------
        Information entered for subchannel number 1 :
        Point number      'X' coordinate     'Y' coordinate
                1              0.00              3.49
                2              6.98              0.00
                3             11.98              0.25
                4             23.98              0.49
        Manning's 'N' friction factor =   0.015
        ------------------------------------------------------------------------
        Sub-Channel flow  =     21.663(CFS)
          '     '         flow top width =     17.981(Ft.)
          '     '    velocity=    6.157(Ft/s)
          '     '         area =      3.518(Sq.Ft)
          '     '         Froude number =     2.453

        Upstream point elevation =  1665.000(Ft.)
        Downstream point elevation =  1638.000(Ft.)
        Flow length =   786.700(Ft.)
        Travel time  =    2.13 min.
        Time of concentration =   16.57 min.
        Depth of flow =   0.491(Ft.)
        Average velocity =   6.157(Ft/s)
        Total irregular channel flow =    21.663(CFS)
        Irregular channel normal depth above invert elev. =   0.491(Ft.)
        Average velocity of channel(s) =   6.157(Ft/s)
         Adding area flow to channel
        SINGLE FAMILY (1 Acre Lot)
        Runoff Coefficient = 0.794
        Decimal fraction soil group A = 0.000
        Decimal fraction soil group B = 0.000
        Decimal fraction soil group C = 0.000
        Decimal fraction soil group D = 1.000
        RI index for soil(AMC 2)  =  75.00
        Pervious area fraction =  0.800; Impervious fraction =  0.200
        Rainfall intensity =      2.569(In/Hr) for a   100.0 year storm
        Subarea runoff =     33.549(CFS) for     16.450(Ac.)
        Total runoff =     38.478(CFS)     Total area =      19.830(Ac.)
        Depth of flow =   0.572(Ft.), Average velocity =   7.717(Ft/s)


        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
        Process from Point/Station      102.000 to Point/Station      103.000
        **** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
        ________________________________________________________________________
        Top of natural channel elevation =   1638.000(Ft.)
        End of natural channel elevation =   1614.000(Ft.)
        Length of natural channel  =  1328.900(Ft.)
        Estimated mean flow rate at midpoint of channel =     66.090(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0181
Corrected/adjusted channel slope =  0.0181
Travel time =    3.93 min.     TC =   20.50  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.787
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.080
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.920
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.860; Impervious fraction =  0.140
Rainfall intensity =      2.335(In/Hr) for a   100.0 year storm
Subarea runoff =     52.308(CFS) for     28.460(Ac.)
Total runoff =     90.786(CFS)     Total area =      48.290(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1614.000(Ft.)
Downstream point/station elevation =  1612.000(Ft.)
Pipe length  =   182.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    90.786(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    90.786(CFS)
Normal flow depth in pipe =   34.13(In.)
Flow top width inside pipe =   25.80(In.)
Critical Depth =   35.25(In.)
Pipe flow velocity =     11.80(Ft/s)
Travel time through pipe =    0.26 min.
Time of concentration (TC) =    20.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.958(Ft.), Average velocity =   4.739(Ft/s)
       ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
----------------------------------------------------------------
Sub-Channel flow  =     90.786(CFS)
  '     '         flow top width =     19.575(Ft.)
  '     '    velocity=    4.739(Ft/s)
  '     '         area =     19.159(Sq.Ft)
  '     '         Froude number =     0.844

Upstream point elevation =  1612.000(Ft.)
Downstream point elevation =  1611.000(Ft.)
Flow length =    76.000(Ft.)
Travel time  =    0.27 min.
Time of concentration =   21.02 min.
Depth of flow =   1.958(Ft.)
Average velocity =   4.739(Ft/s)
Total irregular channel flow =    90.786(CFS)
Irregular channel normal depth above invert elev. =   1.958(Ft.)
Average velocity of channel(s) =   4.739(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1611.000(Ft.)
Downstream point/station elevation =  1610.000(Ft.)
Pipe length  =    70.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    90.786(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    90.786(CFS)
Normal flow depth in pipe =   29.63(In.)
Flow top width inside pipe =   33.33(In.)
Critical Depth =   35.25(In.)
Pipe flow velocity =     13.42(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    21.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.823(Ft.), Average velocity =   5.465(Ft/s)
       ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
----------------------------------------------------------------
Sub-Channel flow  =     90.787(CFS)
  '     '         flow top width =     18.228(Ft.)
  '     '    velocity=    5.465(Ft/s)
  '     '         area =     16.613(Sq.Ft)
  '     '         Froude number =     1.009

Upstream point elevation =  1610.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   285.800(Ft.)
Travel time  =    0.87 min.
Time of concentration =   21.98 min.
```

```
Depth of flow =   1.823(Ft.)
Average velocity =   5.465(Ft/s)
Total irregular channel flow =    90.786(CFS)
Irregular channel normal depth above invert elev. =   1.823(Ft.)
Average velocity of channel(s) =   5.465(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     48.290(Ac.)
Runoff from this stream =     90.786(CFS)
Time of concentration =   21.98 min.
Rainfall intensity =     2.262(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   811.600(Ft.)
Top (of initial area) elevation =  1650.000(Ft.)
Bottom (of initial area) elevation =  1631.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02341  s(percent)=       2.34
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.828 min.
Rainfall intensity =      2.701(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.798
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     14.878(CFS)
Total initial stream area =        6.900(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1631.000(Ft.)
End of natural channel elevation =   1613.000(Ft.)
Length of natural channel  =   872.300(Ft.)
Estimated mean flow rate at midpoint of channel =     25.529(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.60(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0206
Corrected/adjusted channel slope =  0.0206
Travel time =    3.16 min.     TC =   17.99  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.830; Impervious fraction =  0.170
Rainfall intensity =      2.476(In/Hr) for a   100.0 year storm
Subarea runoff =     19.486(CFS) for      9.880(Ac.)
Total runoff =     34.364(CFS)     Total area =      16.780(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.780(Ac.)
Runoff from this stream =     34.364(CFS)
Time of concentration =   17.99 min.
Rainfall intensity =     2.476(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   742.800(Ft.)
Top (of initial area) elevation =  1641.000(Ft.)
Bottom (of initial area) elevation =  1622.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02558  s(percent)=       2.56
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.061 min.
Rainfall intensity =      2.766(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      2.989(CFS)
Total initial stream area =        1.350(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
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Depth of flow =   0.287(Ft.), Average velocity =   1.817(Ft/s)
        ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             60.00              0.00
        3            120.00              3.00
Manning's 'N' friction factor =   0.035
--------------------------------------------------------------------
Sub-Channel flow  =      2.989(CFS)
  '     '          flow top width =     11.471(Ft.)
  '     '    velocity=    1.817(Ft/s)
  '     '          area =      1.645(Sq.Ft)
  '     '          Froude number =     0.846

Upstream point elevation =  1622.000(Ft.)
Downstream point elevation =  1613.000(Ft.)
Flow length =   368.000(Ft.)
Travel time  =    3.37 min.
Time of concentration =   17.44 min.
Depth of flow =   0.287(Ft.)
Average velocity =   1.817(Ft/s)
Total irregular channel flow =     2.989(CFS)
Irregular channel normal depth above invert elev. =   0.287(Ft.)
Average velocity of channel(s) =   1.817(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.350(Ac.)
Runoff from this stream =      2.989(CFS)
Time of concentration =   17.44 min.
Rainfall intensity =     2.511(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       34.364     17.99                2.476
2        2.989     17.44                2.511
Largest stream flow has longer time of concentration
Qp =     34.364 + sum of
           Qb         Ia/Ib
            2.989 *    0.986 =      2.947
Qp =     37.311

Total of 2 streams to confluence:
Flow rates before confluence point:
      34.364       2.989
Area of streams before confluence:
       16.780        1.350
Results of confluence:
Total flow rate =     37.311(CFS)
Time of concentration =    17.989 min.
Effective stream area after confluence =     18.130(Ac.)

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Process from Point/Station      202.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Depth of flow =   1.262(Ft.), Average velocity =   4.688(Ft/s)
        ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
--------------------------------------------------------------------
Sub-Channel flow  =     37.311(CFS)
  '     '          flow top width =     12.617(Ft.)
  '     '    velocity=    4.688(Ft/s)
  '     '          area =      7.959(Sq.Ft)
  '     '          Froude number =     1.040

Upstream point elevation =  1613.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   367.500(Ft.)
Travel time  =    1.31 min.
Time of concentration =   19.30 min.
Depth of flow =   1.262(Ft.)
Average velocity =   4.688(Ft/s)
Total irregular channel flow =    37.311(CFS)
Irregular channel normal depth above invert elev. =   1.262(Ft.)
Average velocity of channel(s) =   4.688(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.130(Ac.)
Runoff from this stream =     37.311(CFS)
Time of concentration =   19.30 min.
Rainfall intensity =     2.399(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       90.786     21.98           2.262
2       37.311     19.30           2.399
Largest stream flow has longer time of concentration
Qp =     90.786 + sum of
           Qb         Ia/Ib
           37.311 *    0.943 =     35.183
Qp =    125.970

Total of 2 main streams to confluence:
Flow rates before confluence point:
```

```
      90.786      37.311
Area of streams before confluence:
       48.290       18.130


Results of confluence:
Total flow rate =    125.970(CFS)
Time of concentration =    21.985 min.
Effective stream area after confluence  =     66.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1604.500(Ft.)
End of natural channel elevation =   1600.000(Ft.)
Length of natural channel  =   465.800(Ft.)
Estimated mean flow rate at midpoint of channel =    137.861(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.14(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    1.51 min.     TC =   23.49  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.765
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  74.70
Pervious area fraction =  0.880; Impervious fraction =  0.120
Rainfall intensity =      2.196(In/Hr) for a   100.0 year storm
Subarea runoff =     21.062(CFS) for     12.540(Ac.)
Total runoff =    147.032(CFS)    Total area =      78.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1600.000(Ft.)
Downstream point/station elevation =  1599.000(Ft.)
Pipe length  =    52.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   147.032(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   147.032(CFS)
Normal flow depth in pipe =   37.41(In.)
Flow top width inside pipe =   26.22(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.25(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    23.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   2.130(Ft.), Average velocity =   6.480(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------------
Sub-Channel flow  =    147.032(CFS)
  '     '         flow top width =     21.303(Ft.)
  '     '    velocity=    6.480(Ft/s)
  '     '         area =     22.692(Sq.Ft)
  '     '         Froude number =     1.106

Upstream point elevation =  1599.000(Ft.)
Downstream point elevation =  1586.000(Ft.)
Flow length =   591.500(Ft.)
Travel time  =    1.52 min.
Time of concentration =   25.07 min.
Depth of flow =   2.130(Ft.)
Average velocity =   6.480(Ft/s)
Total irregular channel flow =   147.032(CFS)
Irregular channel normal depth above invert elev. =   2.130(Ft.)
Average velocity of channel(s) =   6.480(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     78.960(Ac.)
Runoff from this stream =    147.032(CFS)
Time of concentration =   25.07 min.
Rainfall intensity =     2.133(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   527.800(Ft.)
Top (of initial area) elevation =  1635.000(Ft.)
Bottom (of initial area) elevation =  1623.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.02274  s(percent)=       2.27
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.865 min.
Rainfall intensity =      2.784(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.387(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1623.000(Ft.)
End of natural channel elevation =   1608.000(Ft.)
Length of natural channel  =   715.100(Ft.)
Estimated mean flow rate at midpoint of channel =     13.862(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0210
Corrected/adjusted channel slope =  0.0210
Travel time =    3.03 min.     TC =   16.89  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.547(In/Hr) for a   100.0 year storm
Subarea runoff =     13.608(CFS) for      6.320(Ac.)
Total runoff =     19.995(CFS)     Total area =       9.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1608.000(Ft.)
End of natural channel elevation =   1586.000(Ft.)
Length of natural channel  =  1275.000(Ft.)
Estimated mean flow rate at midpoint of channel =     38.494(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.72(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0173
Corrected/adjusted channel slope =  0.0173
Travel time =    4.50 min.     TC =   21.40  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.802
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.210
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.790
RI index for soil(AMC 2)  =  81.20
Pervious area fraction =  0.920; Impervious fraction =  0.080
Rainfall intensity =      2.290(In/Hr) for a   100.0 year storm
Subarea runoff =     30.642(CFS) for     16.690(Ac.)
Total runoff =     50.638(CFS)     Total area =      25.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     25.710(Ac.)
Runoff from this stream =     50.638(CFS)
Time of concentration =   21.40 min.
Rainfall intensity =     2.290(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1      147.032     25.07                 2.133
2       50.638     21.40                 2.290
Largest stream flow has longer time of concentration
Qp =    147.032 + sum of
          Qb         Ia/Ib
          50.638 *    0.931 =     47.153
Qp =    194.184

Total of 2 streams to confluence:
Flow rates before confluence point:
     147.032      50.638
Area of streams before confluence:
       78.960       25.710
Results of confluence:
Total flow rate =    194.184(CFS)
Time of concentration =    25.070 min.
Effective stream area after confluence =    104.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      111.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
```

```
Top of natural channel elevation =   1586.000(Ft.)
End of natural channel elevation =   1562.200(Ft.)
Length of natural channel  =   769.100(Ft.)
Estimated mean flow rate at midpoint of channel =    208.330(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.45(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0309
Corrected/adjusted channel slope =  0.0309
Travel time =    1.23 min.     TC =   26.30  min.
```

Area A

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.087(In/Hr) for a   100.0 year storm
Subarea runoff =     26.551(CFS) for     15.250(Ac.)
Total runoff =    220.736(CFS)     Total area =     119.920(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      311.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   545.200(Ft.)
Top (of initial area) elevation =  1642.000(Ft.)
Bottom (of initial area) elevation =  1621.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.03852  s(percent)=       3.85
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.641 min.
Rainfall intensity =      2.902(In/Hr) for a   100.0 year storm
```

Area B

```
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.979(CFS)
Total initial stream area =        1.610(Ac.)
Pervious area fraction = 1.000

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      312.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________

Top of natural channel elevation =   1621.000(Ft.)
End of natural channel elevation =   1607.000(Ft.)
Length of natural channel  =   534.000(Ft.)
Estimated mean flow rate at midpoint of channel =      6.451(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.63(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0262
Corrected/adjusted channel slope =  0.0262
Travel time =    2.45 min.     TC =   15.09  min.

 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.795
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.770
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.230
RI index for soil(AMC 2)  =  79.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.680(In/Hr) for a   100.0 year storm
Subarea runoff =      4.260(CFS) for      2.000(Ac.)
Total runoff =      8.239(CFS)     Total area =       3.610(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   543.400(Ft.)
Top (of initial area) elevation =  1613.000(Ft.)
Bottom (of initial area) elevation =  1604.000(Ft.)
Difference in elevation =     9.000(Ft.)
Slope =    0.01656  s(percent)=       1.66
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.945 min.
Rainfall intensity =      2.692(In/Hr) for a   100.0 year storm
```

Area C

```
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.160
RI index for soil(AMC 2)  =  79.76
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.971(CFS)
Total initial stream area =        2.310(Ac.)
Pervious area fraction = 1.000

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      511.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
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Initial area flow distance =   268.700(Ft.)
Top (of initial area) elevation =  1630.500(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    16.500(Ft.)
Slope =    0.06141  s(percent)=       6.14
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.676 min.
Rainfall intensity =      3.438(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.104(CFS)
Total initial stream area =        1.390(Ac.)
Pervious area fraction = 1.000
```

Area D

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   658.400(Ft.)
Top (of initial area) elevation =  1653.000(Ft.)
Bottom (of initial area) elevation =  1605.000(Ft.)
Difference in elevation =    48.000(Ft.)
Slope =    0.07290  s(percent)=       7.29
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.998 min.
Rainfall intensity =      2.971(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.614(CFS)
Total initial stream area =        3.400(Ac.)
Pervious area fraction = 1.000
```

Area E

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1605.000(Ft.)
End of natural channel elevation =   1576.000(Ft.)
Length of natural channel  =  1342.600(Ft.)
Estimated mean flow rate at midpoint of channel =     43.159(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.45(Ft/s)
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0216
Corrected/adjusted channel slope =  0.0216
Travel time =    4.10 min.     TC =   16.10  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.831
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.400
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.603(In/Hr) for a   100.0 year storm
Subarea runoff =     58.963(CFS) for     27.270(Ac.)
Total runoff =     67.577(CFS)     Total area =      30.670(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   456.800(Ft.)
Top (of initial area) elevation =  1598.000(Ft.)
Bottom (of initial area) elevation =  1566.000(Ft.)
Difference in elevation =    32.000(Ft.)
Slope =    0.07005  s(percent)=       7.01
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.449 min.
Rainfall intensity =      3.162(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.167(CFS)
Total initial stream area =        2.650(Ac.)
Pervious area fraction = 1.000
```

Area G

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1566.000(Ft.)
End of natural channel elevation =   1544.500(Ft.)
Length of natural channel  =   997.100(Ft.)
Estimated mean flow rate at midpoint of channel =     26.560(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.75(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0216
Corrected/adjusted channel slope =  0.0216
Travel time =    3.50 min.     TC =   13.94  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.777(In/Hr) for a   100.0 year storm
Subarea runoff =     33.830(CFS) for     14.340(Ac.)
Total runoff =     40.997(CFS)     Total area =      16.990(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   850.600(Ft.)
Top (of initial area) elevation =  1665.000(Ft.)
Bottom (of initial area) elevation =  1575.000(Ft.)
Difference in elevation =    90.000(Ft.)
Slope =    0.10581  s(percent)=      10.58
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.339 min.
Rainfall intensity =      2.934(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.060
Decimal fraction soil group D = 0.940
RI index for soil(AMC 2)  =  88.82
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      9.242(CFS)
Total initial stream area =        3.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1575.000(Ft.)
End of natural channel elevation =   1540.000(Ft.)
Length of natural channel  =  1005.700(Ft.)
Estimated mean flow rate at midpoint of channel =     37.791(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.67(Ft/s)
```

Area F

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0348
Corrected/adjusted channel slope =  0.0348
Travel time =    2.51 min.     TC =   14.85  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  88.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.699(In/Hr) for a   100.0 year storm
Subarea runoff =     52.242(CFS) for     22.860(Ac.)
Total runoff =     61.484(CFS)     Total area =      26.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      611.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   680.600(Ft.)
Top (of initial area) elevation =  1570.000(Ft.)
Bottom (of initial area) elevation =  1541.000(Ft.)
Difference in elevation =    29.000(Ft.)
Slope =    0.04261  s(percent)=       4.26
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.537 min.
Rainfall intensity =      2.814(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.910(CFS)
Total initial stream area =        4.560(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      631.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   881.300(Ft.)
Top (of initial area) elevation =  1576.000(Ft.)
Bottom (of initial area) elevation =  1540.000(Ft.)
Difference in elevation =    36.000(Ft.)
Slope =    0.04085  s(percent)=       4.08
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.139 min.
Rainfall intensity =      2.676(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
```

Area H

Area I

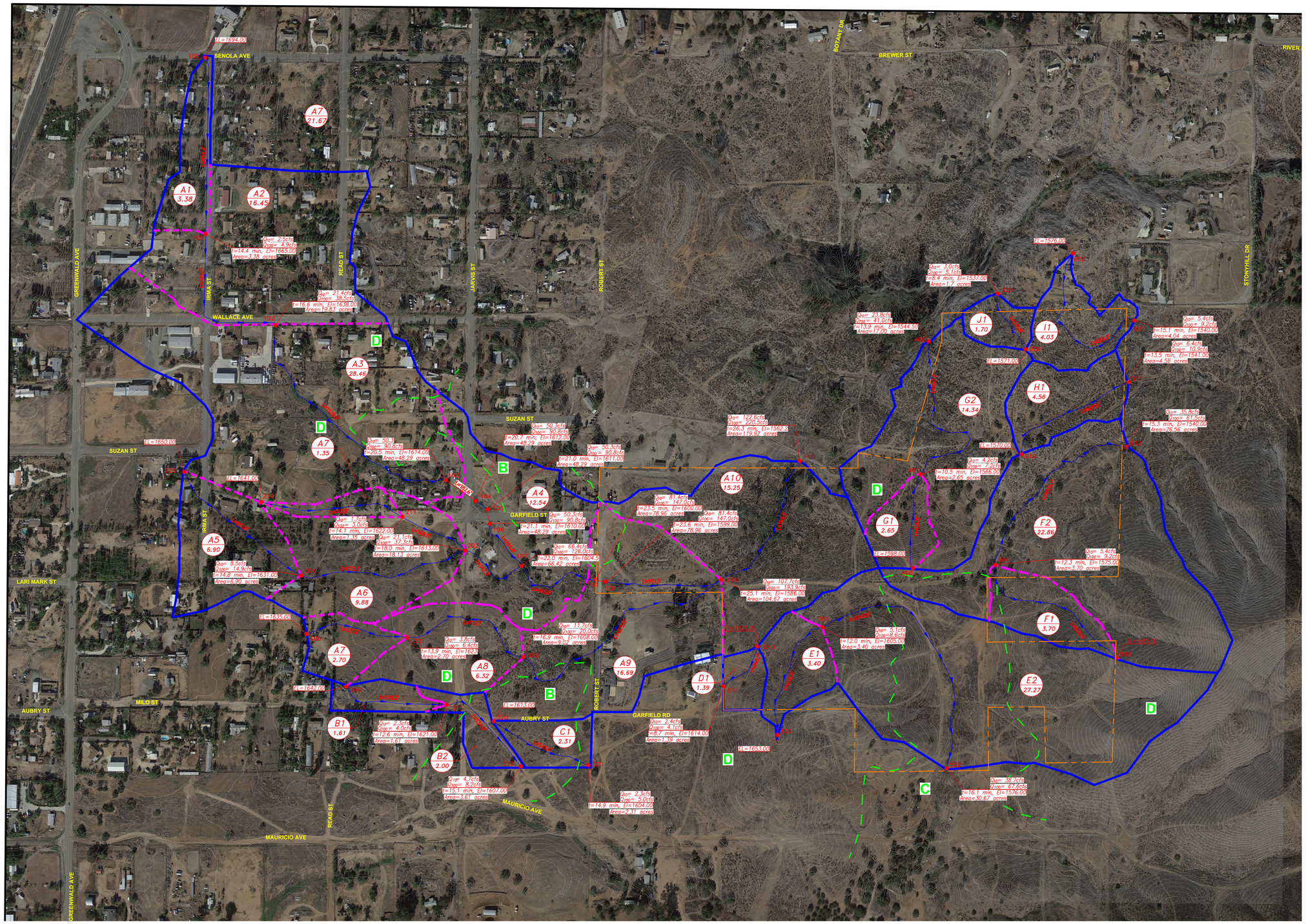
```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      9.166(CFS)
Total initial stream area =        4.040(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      621.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   325.800(Ft.)
Top (of initial area) elevation =  1571.000(Ft.)
Bottom (of initial area) elevation =  1537.000(Ft.)
Difference in elevation =    34.000(Ft.)
Slope =    0.10436  s(percent)=      10.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.429 min.
Rainfall intensity =      3.483(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.088(CFS)
Total initial stream area =        1.700(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =          211.75 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.933
Area averaged RI index number =  82.2
```

Area J

HYDROLOGY MAP



LEGEND

- D / 3.0 — DRAINAGE AREA DESIGNATION / ACREAGE
- MAJOR DRAINAGE AREA BOUNDARY
- SUBAREA DRAINAGE BOUNDARY
- PROPOSED STORM DRAIN
- FLOW LINE (SURFACE FLOW)
- FLOW LINE (PIPE FLOW)
- 1 — NODE & NODE #
- HYDROLOGIC SOILS GROUP BOUNDARY
- PROPERTY BOUNDARY

FEET
0 100 200 400
0 1/2 1 2
INCHES

REVISION	
DATE	DESCRIPTION

APPLICANT:
CLIENT NAME
CLIENT ADDRESS
CITY, STATE ZIP
PH: (000) 000-0000

PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

CRESCENT GARDENS, CITY OF LAKE ELSINORE

HYDROLOGY MAP
EXISTING CONDITIONS

DESIGNED BY:
DRAFTED BY: SM
CHECKED BY: MR
DATE: 05/19/2022
SHEET 1

W.O. 4427-1

DATE: Jan. 02, 2025 08:13:48 AM FILE: \\ASHUR\Projects\1167\Engineering\SY_Hydrology\Crescent Gardens Existing Hydrology-2025-0102.dwg

SECTION 3
PROPOSED CONDITION HYDROLOGY
RATIONAL METHOD ANALYSIS

2 – YEAR RATIONAL METHOD CALCULATIONS

DRAINAGE AREA A

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 12/20/24 File:crproa2.out

Crescent Gardens
Proposed Condition Hydrology
Riverside Co.
Area A 12/12/24

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6406

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.486(In.)
100 year, 1 hour precipitation = 1.440(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.486(In/Hr)
Slope of intensity duration curve = 0.4500

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 894.400(Ft.)
Top (of initial area) elevation = 1694.000(Ft.)
Bottom (of initial area) elevation = 1665.000(Ft.)
Difference in elevation = 29.000(Ft.)
Slope = 0.03242 s(percent)= 3.24
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.444 min.
Rainfall intensity = 0.922(In/Hr) for a 2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.265
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 16.20
Pervious area fraction = 0.800; Impervious fraction = 0.200
Initial subarea runoff = 0.826(CFS)
Total initial stream area = 3.380(Ac.)
Pervious area fraction = 0.800

++
Process from Point/Station 101.000 to Point/Station 102.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 4.341(CFS)
Depth of flow = 0.290(Ft.), Average velocity = 4.564(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	3.49
2	6.98	0.00
3	11.98	0.25
4	23.98	0.49

Manning's 'N' friction factor = 0.015

Sub-Channel flow = 4.341(CFS)
' ' flow top width = 7.594(Ft.)
' ' velocity= 4.564(Ft/s)
' ' area = 0.951(Sq.Ft)
' ' Froude number = 2.273

Upstream point elevation = 1665.000(Ft.)
Downstream point elevation = 1638.000(Ft.)
Flow length = 786.700(Ft.)
Travel time = 2.87 min.
Time of concentration = 17.32 min.
Depth of flow = 0.290(Ft.)
Average velocity = 4.564(Ft/s)
Total irregular channel flow = 4.341(CFS)
Irregular channel normal depth above invert elev. = 0.290(Ft.)
Average velocity of channel(s) = 4.564(Ft/s)
Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.510
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1) = 57.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
Rainfall intensity = 0.850(In/Hr) for a 2.0 year storm
Subarea runoff = 7.130(CFS) for 16.450(Ac.)
Total runoff = 7.956(CFS) Total area = 19.830(Ac.)
Depth of flow = 0.359(Ft.), Average velocity = 4.988(Ft/s)

++
Process from Point/Station 102.000 to Point/Station 103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1638.000(Ft.)
End of natural channel elevation = 1614.000(Ft.)
Length of natural channel = 1328.900(Ft.)
Estimated mean flow rate at midpoint of channel = 13.665(CFS)

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0181
Corrected/adjusted channel slope =  0.0181
Travel time =    6.09 min.     TC =   23.40  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.473
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.080
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.920
RI index for soil(AMC 1)  =  59.40
Pervious area fraction =  0.860; Impervious fraction =  0.140
Rainfall intensity =      0.742(In/Hr) for a     2.0 year storm
Subarea runoff =     10.004(CFS) for     28.460(Ac.)
Total runoff =     17.959(CFS)     Total area =      48.290(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1614.000(Ft.)
Downstream point/station elevation =  1612.000(Ft.)
Pipe length  =   182.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.959(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    17.959(CFS)
Normal flow depth in pipe =   15.63(In.)
Flow top width inside pipe =   22.87(In.)
Critical Depth =   18.32(In.)
Pipe flow velocity =      8.29(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =    23.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.066(Ft.), Average velocity =   3.160(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     17.959(CFS)
  '     '         flow top width =     10.661(Ft.)
  '     '    velocity=    3.160(Ft/s)
  '     '         area =      5.683(Sq.Ft)
  '     '         Froude number =     0.763

Upstream point elevation =  1612.000(Ft.)
Downstream point elevation =  1611.000(Ft.)
Flow length =    76.000(Ft.)
Travel time  =    0.40 min.
Time of concentration =   24.17 min.
Depth of flow =   1.066(Ft.)
Average velocity =   3.160(Ft/s)
Total irregular channel flow =    17.959(CFS)
Irregular channel normal depth above invert elev. =   1.066(Ft.)
Average velocity of channel(s) =   3.160(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1611.000(Ft.)
Downstream point/station elevation =  1610.000(Ft.)
Pipe length  =    70.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.959(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    17.959(CFS)
Normal flow depth in pipe =   16.41(In.)
Flow top width inside pipe =   17.36(In.)
Critical Depth =   18.52(In.)
Pipe flow velocity =      8.91(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    24.30 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.993(Ft.), Average velocity =   3.644(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     17.959(CFS)
  '     '         flow top width =      9.928(Ft.)
  '     '    velocity=    3.644(Ft/s)
  '     '         area =      4.928(Sq.Ft)
  '     '         Froude number =     0.912

Upstream point elevation =  1610.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   285.800(Ft.)
Travel time  =    1.31 min.
Time of concentration =   25.61 min.
Depth of flow =   0.993(Ft.)
```

```
Average velocity =   3.644(Ft/s)
Total irregular channel flow =    17.959(CFS)
Irregular channel normal depth above invert elev. =   0.993(Ft.)
Average velocity of channel(s) =   3.644(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     48.290(Ac.)
Runoff from this stream =     17.959(CFS)
Time of concentration =   25.61 min.
Rainfall intensity =     0.713(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   811.600(Ft.)
Top (of initial area) elevation =  1650.000(Ft.)
Bottom (of initial area) elevation =  1631.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02341  s(percent)=       2.34
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.828 min.
Rainfall intensity =      0.912(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.522
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      3.285(CFS)
Total initial stream area =        6.900(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1631.000(Ft.)
End of natural channel elevation =   1613.000(Ft.)
Length of natural channel  =   872.300(Ft.)
Estimated mean flow rate at midpoint of channel =      5.638(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.12(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0206
Corrected/adjusted channel slope =  0.0206
Travel time =    4.66 min.     TC =   19.49  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.504
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  59.40
Pervious area fraction =  0.830; Impervious fraction =  0.170
Rainfall intensity =      0.806(In/Hr) for a     2.0 year storm
Subarea runoff =      4.011(CFS) for      9.880(Ac.)
Total runoff =      7.296(CFS)     Total area =      16.780(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.780(Ac.)
Runoff from this stream =      7.296(CFS)
Time of concentration =   19.49 min.
Rainfall intensity =     0.806(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   742.800(Ft.)
Top (of initial area) elevation =  1641.000(Ft.)
Bottom (of initial area) elevation =  1622.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02558  s(percent)=       2.56
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.061 min.
Rainfall intensity =      0.934(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.527
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      0.664(CFS)
Total initial stream area =        1.350(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.163(Ft.), Average velocity =   1.248(Ft/s)
```

```
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            60.00             0.00
        3           120.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =      0.664(CFS)
  '     '         flow top width =      6.524(Ft.)
  '     '    velocity=    1.248(Ft/s)
  '     '         area =      0.532(Sq.Ft)
  '     '         Froude number =     0.770

Upstream point elevation =  1622.000(Ft.)
Downstream point elevation =  1613.000(Ft.)
Flow length =   368.000(Ft.)
Travel time  =    4.92 min.
Time of concentration =   18.98 min.
Depth of flow =   0.163(Ft.)
Average velocity =   1.248(Ft/s)
Total irregular channel flow =     0.664(CFS)
Irregular channel normal depth above invert elev. =   0.163(Ft.)
Average velocity of channel(s) =   1.248(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
__________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.350(Ac.)
Runoff from this stream =      0.664(CFS)
Time of concentration =   18.98 min.
Rainfall intensity =     0.816(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        7.296     19.49                 0.806
2        0.664     18.98                 0.816
Largest stream flow has longer time of concentration
Qp =      7.296 + sum of
           Qb         Ia/Ib
            0.664 *    0.988 =      0.656
Qp =      7.952

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.296       0.664
Area of streams before confluence:
       16.780        1.350
Results of confluence:
Total flow rate =      7.952(CFS)
Time of concentration =    19.491 min.
Effective stream area after confluence =     18.130(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
__________________________________________________________________
Depth of flow =   0.707(Ft.), Average velocity =   3.185(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =      7.952(CFS)
  '     '         flow top width =      7.066(Ft.)
  '     '    velocity=    3.185(Ft/s)
  '     '         area =      2.497(Sq.Ft)
  '     '         Froude number =     0.944

Upstream point elevation =  1613.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   367.500(Ft.)
Travel time  =    1.92 min.
Time of concentration =   21.41 min.
Depth of flow =   0.707(Ft.)
Average velocity =   3.185(Ft/s)
Total irregular channel flow =     7.952(CFS)
Irregular channel normal depth above invert elev. =   0.707(Ft.)
Average velocity of channel(s) =   3.185(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
__________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.130(Ac.)
Runoff from this stream =      7.952(CFS)
Time of concentration =   21.41 min.
Rainfall intensity =     0.773(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       17.959     25.61           0.713
2        7.952     21.41           0.773
Largest stream flow has longer time of concentration
Qp =     17.959 + sum of
           Qb         Ia/Ib
            7.952 *    0.923 =      7.337
Qp =     25.296

Total of 2 main streams to confluence:
Flow rates before confluence point:
      17.959       7.952
```

```
Area of streams before confluence:
       48.290       18.130


Results of confluence:
Total flow rate =     25.296(CFS)
Time of concentration =    25.610 min.
Effective stream area after confluence  =     66.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1604.500(Ft.)
End of natural channel elevation =   1600.000(Ft.)
Length of natural channel  =   465.800(Ft.)
Estimated mean flow rate at midpoint of channel =     27.684(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.22(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    2.41 min.     TC =   28.02  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.426
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 1)  =  56.64
Pervious area fraction =  0.880; Impervious fraction =  0.120
Rainfall intensity =      0.685(In/Hr) for a     2.0 year storm
Subarea runoff =      3.657(CFS) for     12.540(Ac.)
Total runoff =     28.953(CFS)     Total area =      78.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1600.000(Ft.)
Downstream point/station elevation =  1599.000(Ft.)
Pipe length  =    52.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.953(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    28.953(CFS)
Normal flow depth in pipe =   18.28(In.)
Flow top width inside pipe =   20.45(In.)
Critical Depth =   22.14(In.)
Pipe flow velocity =     11.26(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    28.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.158(Ft.), Average velocity =   4.316(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------------
Sub-Channel flow  =     28.953(CFS)
  '     '         flow top width =     11.583(Ft.)
  '     '    velocity=    4.316(Ft/s)
  '     '         area =      6.708(Sq.Ft)
  '     '         Froude number =     1.000

Upstream point elevation =  1599.000(Ft.)
Downstream point elevation =  1586.000(Ft.)
Flow length =   591.500(Ft.)
Travel time  =    2.28 min.
Time of concentration =   30.38 min.
Depth of flow =   1.158(Ft.)
Average velocity =   4.316(Ft/s)
Total irregular channel flow =    28.953(CFS)
Irregular channel normal depth above invert elev. =   1.158(Ft.)
Average velocity of channel(s) =   4.316(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     78.960(Ac.)
Runoff from this stream =     28.953(CFS)
Time of concentration =   30.38 min.
Rainfall intensity =     0.660(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   527.800(Ft.)
Top (of initial area) elevation =  1635.000(Ft.)
Bottom (of initial area) elevation =  1623.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.02274  s(percent)=       2.27
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.865 min.
Rainfall intensity =      0.940(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.626
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.587(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1623.000(Ft.)
End of natural channel elevation =   1608.000(Ft.)
Length of natural channel  =   715.100(Ft.)
Estimated mean flow rate at midpoint of channel =      3.445(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0210
Corrected/adjusted channel slope =  0.0210
Travel time =    4.25 min.     TC =   18.11  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.602
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.833(In/Hr) for a     2.0 year storm
Subarea runoff =      3.171(CFS) for      6.320(Ac.)
Total runoff =      4.758(CFS)     Total area =       9.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1608.000(Ft.)
End of natural channel elevation =   1585.000(Ft.)
Length of natural channel  =  1275.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.580(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.23(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0180
Corrected/adjusted channel slope =  0.0180
Travel time =    6.58 min.     TC =   24.69  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.491
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.760
RI index for soil(AMC 1)  =  63.84
Pervious area fraction =  0.890; Impervious fraction =  0.110
Rainfall intensity =      0.725(In/Hr) for a     2.0 year storm
Subarea runoff =      5.158(CFS) for     14.490(Ac.)
Total runoff =      9.917(CFS)     Total area =      23.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     23.510(Ac.)
Runoff from this stream =      9.917(CFS)
Time of concentration =   24.69 min.
Rainfall intensity =     0.725(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       28.953     30.38                 0.660
2        9.917     24.69                 0.725
Largest stream flow has longer time of concentration
Qp =     28.953 + sum of
          Qb         Ia/Ib
           9.917 *    0.911 =      9.033
Qp =     37.986

Total of 2 streams to confluence:
Flow rates before confluence point:
      28.953       9.917
Area of streams before confluence:
       78.960       23.510
Results of confluence:
Total flow rate =     37.986(CFS)
Time of concentration =    30.383 min.
Effective stream area after confluence =    102.470(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.500
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
```

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Runoff Coefficient = 0.583
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  66.64
Pervious area fraction =  0.700; Impervious fraction =  0.300
Time of concentration =    30.38 min.
Rainfall intensity =      0.660(In/Hr) for a     2.0 year storm
Subarea runoff =      1.263(CFS) for      3.280(Ac.)
Total runoff =     39.249(CFS)     Total area =     105.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.500 to Point/Station      110.600
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1599.000(Ft.)
End of natural channel elevation =   1565.000(Ft.)
Length of natural channel  =   508.700(Ft.)
Estimated mean flow rate at midpoint of channel =     39.249(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.34(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0668
Corrected/adjusted channel slope =  0.0668
Travel time =    0.91 min.     TC =   31.29  min.


 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      0.651(In/Hr) for a     2.0 year storm
Subarea runoff =      0.000(CFS) for      0.000(Ac.)
Total runoff =     39.249(CFS)     Total area =     105.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    31.29 min.
Rainfall intensity =      0.651(In/Hr) for a     2.0 year storm
Subarea runoff =      1.250(CFS) for      2.270(Ac.)
Total runoff =     40.499(CFS)     Total area =     108.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.354
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    31.29 min.
Rainfall intensity =      0.651(In/Hr) for a     2.0 year storm
Subarea runoff =      0.419(CFS) for      1.820(Ac.)
Total runoff =     40.918(CFS)     Total area =     109.840(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.700
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1565.000(Ft.)
End of natural channel elevation =   1564.000(Ft.)
Length of natural channel  =    77.200(Ft.)
Estimated mean flow rate at midpoint of channel =     40.918(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.16(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0130
Corrected/adjusted channel slope =  0.0130
Travel time =    0.31 min.     TC =   31.60  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.550
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.649(In/Hr) for a     2.0 year storm
Subarea runoff =      0.000(CFS) for      0.000(Ac.)
Total runoff =     40.918(CFS)     Total area =     109.840(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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Process from Point/Station      110.700 to Point/Station      110.700
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    31.60 min.
Rainfall intensity =      0.649(In/Hr) for a     2.0 year storm
Subarea runoff =      0.943(CFS) for      1.720(Ac.)
Total runoff =     41.861(CFS)     Total area =     111.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.700 to Point/Station      110.700
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    31.60 min.
Rainfall intensity =      0.649(In/Hr) for a     2.0 year storm
Subarea runoff =      0.082(CFS) for      0.150(Ac.)
Total runoff =     41.944(CFS)     Total area =     111.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.700 to Point/Station      111.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1564.000(Ft.)
End of natural channel elevation =   1562.200(Ft.)
Length of natural channel  =   184.900(Ft.)
Estimated mean flow rate at midpoint of channel =     43.541(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.67(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    0.84 min.     TC =   32.44  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.548
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.641(In/Hr) for a     2.0 year storm
Subarea runoff =      2.989(CFS) for      8.510(Ac.)
Total runoff =     44.932(CFS)     Total area =     120.220(Ac.)
End of computations, total study area =          120.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.841
Area averaged RI index number =  77.3
```

DRAINAGE AREAS
B, C, D, F, I, &J

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/02/25  File:crprob2.out
------------------------------------------------------------------------
Crescent Gardens
PROPOSED CONDITION HYDROLOGY
AREAS B,C,D,F,I & J
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.486(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      311.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   545.200(Ft.)
Top (of initial area) elevation =  1642.000(Ft.)
Bottom (of initial area) elevation =  1621.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.03852  s(percent)=       3.85
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.641 min.
Rainfall intensity =      0.980(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.634
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.999(CFS)
```

Area B

```
Total initial stream area =        1.610(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      312.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1621.000(Ft.)
End of natural channel elevation =   1607.000(Ft.)
Length of natural channel  =   534.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.620(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.67(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0262
Corrected/adjusted channel slope =  0.0262
Travel time =    3.34 min.     TC =   15.98  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.465
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.770
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.230
RI index for soil(AMC 1)  =  61.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.882(In/Hr) for a     2.0 year storm
Subarea runoff =      0.820(CFS) for      2.000(Ac.)
Total runoff =      1.819(CFS)     Total area =       3.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   543.400(Ft.)
Top (of initial area) elevation =  1613.000(Ft.)
Bottom (of initial area) elevation =  1604.000(Ft.)
Difference in elevation =     9.000(Ft.)
Slope =    0.01656  s(percent)=       1.66
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.945 min.
Rainfall intensity =      0.908(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.481
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.160
RI index for soil(AMC 1)  =  62.71
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.008(CFS)
```

Area C

```
Total initial stream area =        2.310(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      511.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   153.100(Ft.)
Top (of initial area) elevation =  1643.000(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    29.000(Ft.)
Slope =    0.18942  s(percent)=      18.94
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.531 min.
Rainfall intensity =      1.421(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.698
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.595(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   849.100(Ft.)
Top (of initial area) elevation =  1665.000(Ft.)
Bottom (of initial area) elevation =  1576.000(Ft.)
Difference in elevation =    89.000(Ft.)
Slope =    0.10482  s(percent)=      10.48
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.353 min.
Rainfall intensity =      0.990(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.623
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.260
Decimal fraction soil group D = 0.740
RI index for soil(AMC 1)  =  75.15
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.847(CFS)
Total initial stream area =        4.620(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1576.000(Ft.)
End of natural channel elevation =   1540.000(Ft.)
Length of natural channel  =  1005.700(Ft.)
Estimated mean flow rate at midpoint of channel =      8.553(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.55(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0358
Corrected/adjusted channel slope =  0.0358
Travel time =    3.69 min.     TC =   16.04  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.613
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.880(In/Hr) for a     2.0 year storm
Subarea runoff =      9.991(CFS) for     18.520(Ac.)
Total runoff =     12.838(CFS)     Total area =      23.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      631.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   881.300(Ft.)
Top (of initial area) elevation =  1576.000(Ft.)
Bottom (of initial area) elevation =  1540.000(Ft.)
Difference in elevation =    36.000(Ft.)
Slope =    0.04085  s(percent)=       4.08
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.280 min.
Rainfall intensity =      0.792(In/Hr) for a     2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.508
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  68.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.731(CFS)
Total initial stream area =        4.300(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      621.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   325.800(Ft.)
Top (of initial area) elevation =  1571.000(Ft.)
```

Area D

Area F

Area I

```
Bottom (of initial area) elevation =  1537.000(Ft.)
Difference in elevation =    34.000(Ft.)
Slope =    0.10436  s(percent)=      10.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.429 min.
Rainfall intensity =      1.175(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.666
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.332(CFS)
Total initial stream area =        1.700(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =           35.66 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  87.1
```

Area J

DRAINAGE AREA E

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/01/25  File:crproe2.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condition Hydrology
AREA E
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.486(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   997.400(Ft.)
Top (of initial area) elevation =  1645.400(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    31.400(Ft.)
Slope =    0.03148  s(percent)=       3.15
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.177 min.
Rainfall intensity =      0.902(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.520
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      2.164(CFS)
Total initial stream area =        4.610(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1607.000(Ft.)
Downstream point/station elevation =  1582.000(Ft.)
Pipe length  =  1200.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.164(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.164(CFS)
Normal flow depth in pipe =    6.71(In.)
Flow top width inside pipe =    7.83(In.)
Critical Depth =    7.94(In.)
Pipe flow velocity =      6.12(Ft/s)
Travel time through pipe =    3.27 min.
Time of concentration (TC) =    18.44 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.467
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.280
Decimal fraction soil group D = 0.720
RI index for soil(AMC 1)  =  58.44
Pervious area fraction =  0.900; Impervious fraction =  0.100
Time of concentration =    18.44 min.
Rainfall intensity =      0.826(In/Hr) for a     2.0 year storm
Subarea runoff =      4.270(CFS) for     11.060(Ac.)
Total runoff =      6.434(CFS)     Total area =      15.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1582.000(Ft.)
Downstream point/station elevation =  1580.000(Ft.)
Pipe length  =   225.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.434(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.434(CFS)
Normal flow depth in pipe =   10.58(In.)
Flow top width inside pipe =   17.72(In.)
Critical Depth =   11.77(In.)
Pipe flow velocity =      5.96(Ft/s)
Travel time through pipe =    0.63 min.
Time of concentration (TC) =    19.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      503.000
```

```
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.478
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.270
Decimal fraction soil group D = 0.730
RI index for soil(AMC 1)  =  64.96
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    19.08 min.
Rainfall intensity =      0.814(In/Hr) for a     2.0 year storm
Subarea runoff =      6.444(CFS) for     16.570(Ac.)
Total runoff =     12.878(CFS)    Total area =      32.240(Ac.)
End of computations, total study area =           32.24 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.937
Area averaged RI index number =  78.7
```

DRAINAGE AREA G

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 10/17/23  File:crprog2r.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condtion Hydrology
Area G
10/16/23
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.486(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   770.300(Ft.)
Top (of initial area) elevation =  1610.900(Ft.)
Bottom (of initial area) elevation =  1570.000(Ft.)
Difference in elevation =    40.900(Ft.)
Slope =    0.05310  s(percent)=       5.31
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.787 min.
Rainfall intensity =      1.052(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.636
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      1.224(CFS)
Total initial stream area =        1.830(Ac.)
Pervious area fraction = 0.600


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1570.000(Ft.)
End of street segment elevation =  1557.200(Ft.)
Length of street segment  =   278.400(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   4.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.839(CFS)
Depth of flow =   0.216(Ft.), Average velocity =   4.067(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.112(Ft.)
Flow velocity =   4.07(Ft/s)
Travel time =    1.14 min.     TC =   11.93  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.555
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  61.80
Pervious area fraction =  0.850; Impervious fraction =  0.150
Rainfall intensity =      1.005(In/Hr) for a     2.0 year storm
Subarea runoff =      3.149(CFS) for      5.640(Ac.)
Total runoff =      4.374(CFS)     Total area =       7.470(Ac.)
Street flow at end of street =      4.374(CFS)
Half street flow at end of street =      4.374(CFS)
Depth of flow =   0.246(Ft.), Average velocity =   4.515(Ft/s)
Flow width (from curb towards crown)=   9.637(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1553.500(Ft.)
Downstream point/station elevation =  1553.000(Ft.)
Pipe length  =    43.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.374(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.374(CFS)
Normal flow depth in pipe =    8.65(In.)
Flow top width inside pipe =   14.82(In.)
```

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Critical Depth =   10.16(In.)
Pipe flow velocity =      5.97(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    12.05 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1553.000(Ft.)
End of natural channel elevation =   1544.500(Ft.)
Length of natural channel  =   544.100(Ft.)
Estimated mean flow rate at midpoint of channel =      7.105(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.87(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0156
Corrected/adjusted channel slope =  0.0156
Travel time =    3.16 min.     TC =   15.21  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.618
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.901(In/Hr) for a     2.0 year storm
Subarea runoff =      5.194(CFS) for      9.330(Ac.)
Total runoff =      9.568(CFS)    Total area =      16.800(Ac.)
End of computations, total study area =           16.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.906
Area averaged RI index number =  84.1
```

DRAINAGE AREA H

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                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/01/25  File:crproh2.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condition Hydrology
AREA H
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.486(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      610.500
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   746.900(Ft.)
Top (of initial area) elevation =  1600.500(Ft.)
Bottom (of initial area) elevation =  1577.000(Ft.)
Difference in elevation =    23.500(Ft.)
Slope =    0.03146  s(percent)=       3.15
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.830 min.
Rainfall intensity =      1.009(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.630
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      0.910(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 0.600


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.500 to Point/Station      610.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1573.000(Ft.)
Downstream point/station elevation =  1551.000(Ft.)
Pipe length  =   619.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.910(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.910(CFS)
Normal flow depth in pipe =    4.29(In.)
Flow top width inside pipe =    5.42(In.)
Critical Depth =    5.55(In.)
Pipe flow velocity =      6.06(Ft/s)
Travel time through pipe =    1.70 min.
Time of concentration (TC) =    13.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.600 to Point/Station      610.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.550
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  61.92
Pervious area fraction =  0.840; Impervious fraction =  0.160
Time of concentration =    13.54 min.
Rainfall intensity =      0.950(In/Hr) for a     2.0 year storm
Subarea runoff =      2.961(CFS) for      5.670(Ac.)
Total runoff =      3.870(CFS)     Total area =       7.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.600 to Point/Station      611.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1551.000(Ft.)
Downstream point/station elevation =  1544.500(Ft.)
Pipe length  =   304.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.870(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.870(CFS)
Normal flow depth in pipe =    7.71(In.)
Flow top width inside pipe =   11.51(In.)
Critical Depth =   10.03(In.)
Pipe flow velocity =      7.26(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =    14.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      611.000 to Point/Station      612.000
```

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**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________
Top of natural channel elevation =   1544.500(Ft.)
End of natural channel elevation =   1541.000(Ft.)
Length of natural channel  =    58.000(Ft.)
Estimated mean flow rate at midpoint of channel =      4.208(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0603
Corrected/adjusted channel slope =  0.0603
Travel time =    0.19 min.     TC =   14.43  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.622
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.923(In/Hr) for a     2.0 year storm
Subarea runoff =      0.712(CFS) for      1.240(Ac.)
Total runoff =      4.583(CFS)     Total area =       8.340(Ac.)
End of computations, total study area =            8.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.823
Area averaged RI index number =  79.9
```

10 – YEAR RATIONAL METHOD CALCULATIONS

DRAINAGE AREA A

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 12/20/24 File:CRPROA10.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6406

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.486(In.)
100 year, 1 hour precipitation = 1.440(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.878(In/Hr)
Slope of intensity duration curve = 0.4500

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 894.400(Ft.)
Top (of initial area) elevation = 1694.000(Ft.)
Bottom (of initial area) elevation = 1665.000(Ft.)
Difference in elevation = 29.000(Ft.)
Slope = 0.03242 s(percent)= 3.24
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.444 min.
Rainfall intensity = 1.667(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.447
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 32.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
Initial subarea runoff = 2.518(CFS)
Total initial stream area = 3.380(Ac.)
Pervious area fraction = 0.800

++

Process from Point/Station 101.000 to Point/Station 102.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 11.953(CFS)
Depth of flow = 0.408(Ft.), Average velocity = 5.404(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	3.49
2	6.98	0.00
3	11.98	0.25
4	23.98	0.49

Manning's 'N' friction factor = 0.015

Sub-Channel flow = 11.953(CFS)
' ' flow top width = 13.740(Ft.)
' ' velocity= 5.404(Ft/s)
' ' area = 2.212(Sq.Ft)
' ' Froude number = 2.373

Upstream point elevation = 1665.000(Ft.)
Downstream point elevation = 1638.000(Ft.)
Flow length = 786.700(Ft.)
Travel time = 2.43 min.
Time of concentration = 16.87 min.
Depth of flow = 0.408(Ft.)
Average velocity = 5.404(Ft/s)
Total irregular channel flow = 11.953(CFS)
Irregular channel normal depth above invert elev. = 0.408(Ft.)
Average velocity of channel(s) = 5.404(Ft/s)
Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.740
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
Rainfall intensity = 1.555(In/Hr) for a 10.0 year storm
Subarea runoff = 18.926(CFS) for 16.450(Ac.)
Total runoff = 21.444(CFS) Total area = 19.830(Ac.)
Depth of flow = 0.489(Ft.), Average velocity = 6.137(Ft/s)

++
Process from Point/Station 102.000 to Point/Station 103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1638.000(Ft.)
End of natural channel elevation = 1614.000(Ft.)
Length of natural channel = 1328.900(Ft.)
Estimated mean flow rate at midpoint of channel = 36.832(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 4.77(Ft/s)

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0181
Corrected/adjusted channel slope =  0.0181
Travel time =    4.65 min.     TC =   21.52  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.728
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.080
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.920
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.860; Impervious fraction =  0.140
Rainfall intensity =      1.394(In/Hr) for a    10.0 year storm
Subarea runoff =     28.874(CFS) for     28.460(Ac.)
Total runoff =     50.318(CFS)     Total area =      48.290(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1614.000(Ft.)
Downstream point/station elevation =  1612.000(Ft.)
Pipe length  =   182.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.318(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    50.318(CFS)
Normal flow depth in pipe =   24.70(In.)
Flow top width inside pipe =   28.63(In.)
Critical Depth =   28.00(In.)
Pipe flow velocity =     10.56(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =    21.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.569(Ft.), Average velocity =   4.089(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     50.318(CFS)
  '     '         flow top width =     15.689(Ft.)
  '     '    velocity=    4.089(Ft/s)
  '     '         area =     12.307(Sq.Ft)
  '     '         Froude number =     0.814

Upstream point elevation =  1612.000(Ft.)
Downstream point elevation =  1611.000(Ft.)
Flow length =    76.000(Ft.)
Travel time  =    0.31 min.
Time of concentration =   22.11 min.
Depth of flow =   1.569(Ft.)
Average velocity =   4.089(Ft/s)
Total irregular channel flow =    50.318(CFS)
Irregular channel normal depth above invert elev. =   1.569(Ft.)
Average velocity of channel(s) =   4.089(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1611.000(Ft.)
Downstream point/station elevation =  1610.000(Ft.)
Pipe length  =    70.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    50.318(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    50.318(CFS)
Normal flow depth in pipe =   25.59(In.)
Flow top width inside pipe =   21.24(In.)
Critical Depth =   27.63(In.)
Pipe flow velocity =     11.28(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    22.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.461(Ft.), Average velocity =   4.715(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     50.318(CFS)
  '     '         flow top width =     14.609(Ft.)
  '     '    velocity=    4.715(Ft/s)
  '     '         area =     10.672(Sq.Ft)
  '     '         Froude number =     0.972

Upstream point elevation =  1610.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   285.800(Ft.)
Travel time  =    1.01 min.
Time of concentration =   23.23 min.
Depth of flow =   1.461(Ft.)
Average velocity =   4.715(Ft/s)
Total irregular channel flow =    50.318(CFS)
Irregular channel normal depth above invert elev. =   1.461(Ft.)
Average velocity of channel(s) =   4.715(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     48.290(Ac.)
Runoff from this stream =     50.318(CFS)
Time of concentration =   23.23 min.
Rainfall intensity =     1.346(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   811.600(Ft.)
Top (of initial area) elevation =  1650.000(Ft.)
Bottom (of initial area) elevation =  1631.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02341  s(percent)=       2.34
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.828 min.
Rainfall intensity =      1.648(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.747
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      8.494(CFS)
Total initial stream area =        6.900(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1631.000(Ft.)
End of natural channel elevation =   1613.000(Ft.)
Length of natural channel  =   872.300(Ft.)
Estimated mean flow rate at midpoint of channel =     14.575(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.96(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0206
Corrected/adjusted channel slope =  0.0206
Travel time =    3.67 min.     TC =   18.50  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.830; Impervious fraction =  0.170
Rainfall intensity =      1.492(In/Hr) for a    10.0 year storm
Subarea runoff =     10.943(CFS) for      9.880(Ac.)
Total runoff =     19.437(CFS)     Total area =      16.780(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.780(Ac.)
Runoff from this stream =     19.437(CFS)
Time of concentration =   18.50 min.
Rainfall intensity =     1.492(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   742.800(Ft.)
Top (of initial area) elevation =  1641.000(Ft.)
Bottom (of initial area) elevation =  1622.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02558  s(percent)=       2.56
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.061 min.
Rainfall intensity =      1.688(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.750
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      1.709(CFS)
Total initial stream area =        1.350(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Depth of flow =   0.233(Ft.), Average velocity =   1.580(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
         1             0.00             3.00
```

```
        2             60.00              0.00
        3            120.00              3.00
Manning's 'N' friction factor =   0.035
-----------------------------------------------------------------
Sub-Channel flow  =      1.709(CFS)
  '     '         flow top width =      9.300(Ft.)
  '     '    velocity=    1.580(Ft/s)
  '     '         area =      1.081(Sq.Ft)
  '     '         Froude number =     0.817

Upstream point elevation =  1622.000(Ft.)
Downstream point elevation =  1613.000(Ft.)
Flow length =   368.000(Ft.)
Travel time  =    3.88 min.
Time of concentration =   17.94 min.
Depth of flow =   0.233(Ft.)
Average velocity =   1.580(Ft/s)
Total irregular channel flow =     1.709(CFS)
Irregular channel normal depth above invert elev. =   0.233(Ft.)
Average velocity of channel(s) =   1.580(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.350(Ac.)
Runoff from this stream =      1.709(CFS)
Time of concentration =   17.94 min.
Rainfall intensity =     1.512(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       19.437     18.50                1.492
2        1.709     17.94                1.512
Largest stream flow has longer time of concentration
Qp =     19.437 + sum of
           Qb         Ia/Ib
            1.709 *    0.986 =      1.685
Qp =     21.122

Total of 2 streams to confluence:
Flow rates before confluence point:
      19.437       1.709
Area of streams before confluence:
       16.780        1.350
Results of confluence:
Total flow rate =     21.122(CFS)
Time of concentration =    18.503 min.
Effective stream area after confluence =     18.130(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
```

```
Depth of flow =   1.019(Ft.), Average velocity =   4.066(Ft/s)
        ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
-----------------------------------------------------------------
Sub-Channel flow  =     21.122(CFS)
  '     '         flow top width =     10.193(Ft.)
  '     '    velocity=    4.066(Ft/s)
  '     '         area =      5.195(Sq.Ft)
  '     '         Froude number =     1.004

Upstream point elevation =  1613.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   367.500(Ft.)
Travel time  =    1.51 min.
Time of concentration =   20.01 min.
Depth of flow =   1.019(Ft.)
Average velocity =   4.066(Ft/s)
Total irregular channel flow =    21.122(CFS)
Irregular channel normal depth above invert elev. =   1.019(Ft.)
Average velocity of channel(s) =   4.066(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.130(Ac.)
Runoff from this stream =     21.122(CFS)
Time of concentration =   20.01 min.
Rainfall intensity =     1.440(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       50.318     23.23           1.346
2       21.122     20.01           1.440
Largest stream flow has longer time of concentration
Qp =     50.318 + sum of
           Qb         Ia/Ib
           21.122 *    0.935 =     19.750
Qp =     70.068

Total of 2 main streams to confluence:
Flow rates before confluence point:
      50.318      21.122
Area of streams before confluence:
       48.290       18.130


Results of confluence:
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```
Total flow rate =     70.068(CFS)
Time of concentration =    23.229 min.
Effective stream area after confluence  =     66.420(Ac.)


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Process from Point/Station      107.000 to Point/Station      108.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1604.500(Ft.)
End of natural channel elevation =   1600.000(Ft.)
Length of natural channel  =   465.800(Ft.)
Estimated mean flow rate at midpoint of channel =     76.683(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.31(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    1.80 min.     TC =   25.03  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.696
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  74.70
Pervious area fraction =  0.880; Impervious fraction =  0.120
Rainfall intensity =      1.302(In/Hr) for a    10.0 year storm
Subarea runoff =     11.364(CFS) for     12.540(Ac.)
Total runoff =     81.432(CFS)     Total area =      78.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1600.000(Ft.)
Downstream point/station elevation =  1599.000(Ft.)
Pipe length  =    52.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    81.432(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    81.432(CFS)
Normal flow depth in pipe =   26.34(In.)
Flow top width inside pipe =   31.90(In.)
Critical Depth =   33.38(In.)
Pipe flow velocity =     14.68(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    25.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.707(Ft.), Average velocity =   5.590(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00              3.00
        2            15.00              0.00
        3            30.00              3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     81.432(CFS)
  '     '         flow top width =     17.069(Ft.)
  '     '    velocity=    5.590(Ft/s)
  '     '         area =     14.568(Sq.Ft)
  '     '         Froude number =     1.066

Upstream point elevation =  1599.000(Ft.)
Downstream point elevation =  1586.000(Ft.)
Flow length =   591.500(Ft.)
Travel time  =    1.76 min.
Time of concentration =   26.85 min.
Depth of flow =   1.707(Ft.)
Average velocity =   5.590(Ft/s)
Total irregular channel flow =    81.432(CFS)
Irregular channel normal depth above invert elev. =   1.707(Ft.)
Average velocity of channel(s) =   5.590(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     78.960(Ac.)
Runoff from this stream =     81.432(CFS)
Time of concentration =   26.85 min.
Rainfall intensity =     1.261(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   527.800(Ft.)
Top (of initial area) elevation =  1635.000(Ft.)
Bottom (of initial area) elevation =  1623.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.02274  s(percent)=       2.27
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.865 min.
Rainfall intensity =      1.698(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
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```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.762(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1623.000(Ft.)
End of natural channel elevation =   1608.000(Ft.)
Length of natural channel  =   715.100(Ft.)
Estimated mean flow rate at midpoint of channel =      8.165(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.44(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0210
Corrected/adjusted channel slope =  0.0210
Travel time =    3.46 min.     TC =   17.33  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.536(In/Hr) for a    10.0 year storm
Subarea runoff =      7.891(CFS) for      6.320(Ac.)
Total runoff =     11.653(CFS)     Total area =       9.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1608.000(Ft.)
End of natural channel elevation =   1585.000(Ft.)
Length of natural channel  =  1275.000(Ft.)
Estimated mean flow rate at midpoint of channel =     21.014(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.08(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0180
Corrected/adjusted channel slope =  0.0180
Travel time =    5.21 min.     TC =   22.54  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.748
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.760
RI index for soil(AMC 2)  =  80.60
Pervious area fraction =  0.890; Impervious fraction =  0.110
Rainfall intensity =      1.365(In/Hr) for a    10.0 year storm
Subarea runoff =     14.783(CFS) for     14.490(Ac.)
Total runoff =     26.436(CFS)     Total area =      23.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     23.510(Ac.)
Runoff from this stream =     26.436(CFS)
Time of concentration =   22.54 min.
Rainfall intensity =     1.365(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       81.432     26.85                  1.261
2       26.436     22.54                  1.365
Largest stream flow has longer time of concentration
Qp =     81.432 + sum of
          Qb         Ia/Ib
          26.436 *    0.924 =     24.433
Qp =    105.865

Total of 2 streams to confluence:
Flow rates before confluence point:
      81.432      26.436
Area of streams before confluence:
       78.960       23.510
Results of confluence:
Total flow rate =    105.865(CFS)
Time of concentration =    26.854 min.
Effective stream area after confluence =    102.470(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.500
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
```

```
RI index for soil(AMC 2)  =  82.60
Pervious area fraction =  0.700; Impervious fraction =  0.300
Time of concentration =    26.85 min.
Rainfall intensity =      1.261(In/Hr) for a    10.0 year storm
Subarea runoff =      3.249(CFS) for      3.280(Ac.)
Total runoff =    109.114(CFS)    Total area =     105.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.500 to Point/Station      110.600
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1599.000(Ft.)
End of natural channel elevation =   1565.000(Ft.)
Length of natural channel  =   508.700(Ft.)
Estimated mean flow rate at midpoint of channel =    109.114(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.60(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0668
Corrected/adjusted channel slope =  0.0668
Travel time =    0.67 min.     TC =   27.53  min.


 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.247(In/Hr) for a    10.0 year storm
Subarea runoff =      0.000(CFS) for      0.000(Ac.)
Total runoff =    109.114(CFS)    Total area =     105.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    27.53 min.
Rainfall intensity =      1.247(In/Hr) for a    10.0 year storm
Subarea runoff =      2.482(CFS) for      2.270(Ac.)
Total runoff =    111.595(CFS)    Total area =     108.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.664
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    27.53 min.
Rainfall intensity =      1.247(In/Hr) for a    10.0 year storm
Subarea runoff =      1.507(CFS) for      1.820(Ac.)
Total runoff =    113.102(CFS)    Total area =     109.840(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.700
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1565.000(Ft.)
End of natural channel elevation =   1564.000(Ft.)
Length of natural channel  =    77.200(Ft.)
Estimated mean flow rate at midpoint of channel =    113.102(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.61(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0130
Corrected/adjusted channel slope =  0.0130
Travel time =    0.23 min.     TC =   27.76  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.795
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.243(In/Hr) for a    10.0 year storm
Subarea runoff =      0.000(CFS) for      0.000(Ac.)
Total runoff =    113.102(CFS)    Total area =     109.840(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.700 to Point/Station      110.700
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.876
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    27.76 min.
Rainfall intensity =      1.243(In/Hr) for a    10.0 year storm
Subarea runoff =      1.873(CFS) for      1.720(Ac.)
Total runoff =    114.975(CFS)    Total area =     111.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.700 to Point/Station      110.700
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    27.76 min.
Rainfall intensity =      1.243(In/Hr) for a    10.0 year storm
Subarea runoff =      0.163(CFS) for      0.150(Ac.)
Total runoff =    115.138(CFS)    Total area =     111.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.700 to Point/Station      111.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1564.000(Ft.)
End of natural channel elevation =   1562.200(Ft.)
Length of natural channel  =   184.900(Ft.)
Estimated mean flow rate at midpoint of channel =    119.524(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    0.62 min.     TC =   28.38  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.794
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.230(In/Hr) for a    10.0 year storm
Subarea runoff =      8.311(CFS) for      8.510(Ac.)
Total runoff =    123.449(CFS)    Total area =     120.220(Ac.)
End of computations, total study area =          120.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.841
Area averaged RI index number =  77.3
```

DRAINAGE AREAS
B, C, D, F, I, &J

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/01/25  File:CRPROB10.out
------------------------------------------------------------------------
Crescent Gardens
PROPOSED CONDITION HYDROLOGY
AREAS B,C,D,F,I & J
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.878(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      311.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   545.200(Ft.)
Top (of initial area) elevation =  1642.000(Ft.)
Bottom (of initial area) elevation =  1621.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.03852  s(percent)=       3.85
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.641 min.
Rainfall intensity =      1.771(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.347(CFS)
```

Area B

```
Total initial stream area =        1.610(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      312.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1621.000(Ft.)
End of natural channel elevation =   1607.000(Ft.)
Length of natural channel  =   534.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.805(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0262
Corrected/adjusted channel slope =  0.0262
Travel time =    2.78 min.     TC =   15.42  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.738
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.770
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.230
RI index for soil(AMC 2)  =  79.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.619(In/Hr) for a    10.0 year storm
Subarea runoff =      2.391(CFS) for      2.000(Ac.)
Total runoff =      4.738(CFS)     Total area =       3.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   543.400(Ft.)
Top (of initial area) elevation =  1613.000(Ft.)
Bottom (of initial area) elevation =  1604.000(Ft.)
Difference in elevation =     9.000(Ft.)
Slope =    0.01656  s(percent)=       1.66
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.945 min.
Rainfall intensity =      1.642(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.746
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.160
RI index for soil(AMC 2)  =  79.76
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.831(CFS)
```

Area C

```
Total initial stream area =        2.310(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      511.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   153.100(Ft.)
Top (of initial area) elevation =  1643.000(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    29.000(Ft.)
Slope =    0.18942  s(percent)=      18.94
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.531 min.
Rainfall intensity =      2.568(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.303(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   849.100(Ft.)
Top (of initial area) elevation =  1665.000(Ft.)
Bottom (of initial area) elevation =  1576.000(Ft.)
Difference in elevation =    89.000(Ft.)
Slope =    0.10482  s(percent)=      10.48
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.353 min.
Rainfall intensity =      1.789(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.260
Decimal fraction soil group D = 0.740
RI index for soil(AMC 2)  =  88.22
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.765(CFS)
Total initial stream area =        4.620(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1576.000(Ft.)
End of natural channel elevation =   1540.000(Ft.)
```

Area D

Area F

```
Length of natural channel  =  1005.700(Ft.)
Estimated mean flow rate at midpoint of channel =     20.325(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.69(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0358
Corrected/adjusted channel slope =  0.0358
Travel time =    2.94 min.     TC =   15.30  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.625(In/Hr) for a    10.0 year storm
Subarea runoff =     24.590(CFS) for     18.520(Ac.)
Total runoff =     31.356(CFS)     Total area =      23.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      631.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   881.300(Ft.)
Top (of initial area) elevation =  1576.000(Ft.)
Bottom (of initial area) elevation =  1540.000(Ft.)
Difference in elevation =    36.000(Ft.)
Slope =    0.04085  s(percent)=       4.08
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.280 min.
Rainfall intensity =      1.431(In/Hr) for a    10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.764
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  84.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.704(CFS)
Total initial stream area =        4.300(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      621.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   325.800(Ft.)
Top (of initial area) elevation =  1571.000(Ft.)
```

Area I

```
Bottom (of initial area) elevation =  1537.000(Ft.)
Difference in elevation =    34.000(Ft.)
Slope =    0.10436  s(percent)=      10.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.429 min.
Rainfall intensity =      2.125(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.017(CFS)
Total initial stream area =        1.700(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =           35.66 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  87.1
```

Area J

DRAINAGE AREA E

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/01/25  File:crproe10.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condition Hydrology
AREA E
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.878(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   997.400(Ft.)
Top (of initial area) elevation =  1645.400(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    31.400(Ft.)
Slope =    0.03148  s(percent)=       3.15
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.177 min.
Rainfall intensity =      1.631(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.746
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      5.606(CFS)
Total initial stream area =        4.610(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1607.000(Ft.)
Downstream point/station elevation =  1582.000(Ft.)
Pipe length  =  1200.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.606(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.606(CFS)
Normal flow depth in pipe =    8.39(In.)
Flow top width inside pipe =   14.89(In.)
Critical Depth =   11.51(In.)
Pipe flow velocity =      7.95(Ft/s)
Travel time through pipe =    2.52 min.
Time of concentration (TC) =    17.69 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.726
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.280
Decimal fraction soil group D = 0.720
RI index for soil(AMC 2)  =  76.20
Pervious area fraction =  0.900; Impervious fraction =  0.100
Time of concentration =    17.69 min.
Rainfall intensity =      1.522(In/Hr) for a    10.0 year storm
Subarea runoff =     12.219(CFS) for     11.060(Ac.)
Total runoff =     17.826(CFS)     Total area =      15.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1582.000(Ft.)
Downstream point/station elevation =  1580.000(Ft.)
Pipe length  =   225.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.826(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    17.826(CFS)
Normal flow depth in pipe =   16.80(In.)
Flow top width inside pipe =   21.99(In.)
Critical Depth =   18.24(In.)
Pipe flow velocity =      7.59(Ft/s)
Travel time through pipe =    0.50 min.
Time of concentration (TC) =    18.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      503.000
```

```
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.748
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.270
Decimal fraction soil group D = 0.730
RI index for soil(AMC 2)  =  81.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    18.19 min.
Rainfall intensity =      1.503(In/Hr) for a    10.0 year storm
Subarea runoff =     18.637(CFS) for     16.570(Ac.)
Total runoff =     36.463(CFS)    Total area =      32.240(Ac.)
End of computations, total study area =           32.24 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.937
Area averaged RI index number =  78.7
```

DRAINAGE AREA G

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 10/17/23  File:crprog10r.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condtion Hydrology
Area G
10/16/23
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.878(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   770.300(Ft.)
Top (of initial area) elevation =  1610.900(Ft.)
Bottom (of initial area) elevation =  1570.000(Ft.)
Difference in elevation =    40.900(Ft.)
Slope =    0.05310  s(percent)=       5.31
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.787 min.
Rainfall intensity =      1.901(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.798
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      2.776(CFS)
Total initial stream area =        1.830(Ac.)
Pervious area fraction = 0.600


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1570.000(Ft.)
End of street segment elevation =  1557.200(Ft.)
Length of street segment  =   278.400(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   4.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      6.820(CFS)
Depth of flow =   0.283(Ft.), Average velocity =   5.032(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.469(Ft.)
Flow velocity =   5.03(Ft/s)
Travel time =    0.92 min.     TC =   11.71  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.776
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  79.00
Pervious area fraction =  0.850; Impervious fraction =  0.150
Rainfall intensity =      1.833(In/Hr) for a    10.0 year storm
Subarea runoff =      8.021(CFS) for      5.640(Ac.)
Total runoff =     10.797(CFS)    Total area =       7.470(Ac.)
Street flow at end of street =     10.797(CFS)
Half street flow at end of street =     10.797(CFS)
Depth of flow =   0.327(Ft.), Average velocity =   5.634(Ft/s)
Flow width (from curb towards crown)=  13.698(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1553.500(Ft.)
Downstream point/station elevation =  1553.000(Ft.)
Pipe length  =    43.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.797(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.797(CFS)
Normal flow depth in pipe =   14.13(In.)
Flow top width inside pipe =   14.79(In.)
```

```
Critical Depth =   15.12(In.)
Pipe flow velocity =      7.26(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    11.81 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1553.000(Ft.)
End of natural channel elevation =   1544.500(Ft.)
Length of natural channel  =   544.100(Ft.)
Estimated mean flow rate at midpoint of channel =     17.539(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.62(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0156
Corrected/adjusted channel slope =  0.0156
Travel time =    2.51 min.     TC =   14.32  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.819
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.674(In/Hr) for a    10.0 year storm
Subarea runoff =     12.797(CFS) for      9.330(Ac.)
Total runoff =     23.594(CFS)    Total area =      16.800(Ac.)
End of computations, total study area =           16.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.906
Area averaged RI index number =  84.1
```

DRAINAGE AREA H

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/01/25  File:crproh10.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condition Hydrology
AREA H
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.878(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      610.500
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   746.900(Ft.)
Top (of initial area) elevation =  1600.500(Ft.)
Bottom (of initial area) elevation =  1577.000(Ft.)
Difference in elevation =    23.500(Ft.)
Slope =    0.03146  s(percent)=       3.15
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.830 min.
Rainfall intensity =      1.824(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.794
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      2.072(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 0.600


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.500 to Point/Station      610.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1573.000(Ft.)
Downstream point/station elevation =  1551.000(Ft.)
Pipe length  =   619.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.072(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.072(CFS)
Normal flow depth in pipe =    5.36(In.)
Flow top width inside pipe =    8.83(In.)
Critical Depth =    7.81(In.)
Pipe flow velocity =      7.55(Ft/s)
Travel time through pipe =    1.37 min.
Time of concentration (TC) =    13.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.600 to Point/Station      610.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.772
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  79.10
Pervious area fraction =  0.840; Impervious fraction =  0.160
Time of concentration =    13.20 min.
Rainfall intensity =      1.736(In/Hr) for a    10.0 year storm
Subarea runoff =      7.606(CFS) for      5.670(Ac.)
Total runoff =      9.678(CFS)     Total area =       7.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.600 to Point/Station      611.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1551.000(Ft.)
Downstream point/station elevation =  1544.500(Ft.)
Pipe length  =   304.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.678(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.678(CFS)
Normal flow depth in pipe =   10.36(In.)
Flow top width inside pipe =   17.79(In.)
Critical Depth =   14.41(In.)
Pipe flow velocity =      9.18(Ft/s)
Travel time through pipe =    0.55 min.
Time of concentration (TC) =    13.75 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      611.000 to Point/Station      612.000
```

```
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________
Top of natural channel elevation =   1544.500(Ft.)
End of natural channel elevation =   1541.000(Ft.)
Length of natural channel  =    58.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.523(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.22(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0603
Corrected/adjusted channel slope =  0.0603
Travel time =    0.16 min.     TC =   13.91  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.696(In/Hr) for a    10.0 year storm
Subarea runoff =      1.725(CFS) for      1.240(Ac.)
Total runoff =     11.403(CFS)     Total area =       8.340(Ac.)
End of computations, total study area =            8.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.823
Area averaged RI index number =  79.9
```

100 – YEAR RATIONAL METHOD CALCULATIONS

DRAINAGE AREA A

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 12/20/24 File:CRPROA100.out

Crescent Gardens
Proposed Condtion Hydrology
Riverside Co.
Area A 12/12/24

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6406

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.486(In.)
100 year, 1 hour precipitation = 1.440(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.440(In/Hr)
Slope of intensity duration curve = 0.4500

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 894.400(Ft.)
Top (of initial area) elevation = 1694.000(Ft.)
Bottom (of initial area) elevation = 1665.000(Ft.)
Difference in elevation = 29.000(Ft.)
Slope = 0.03242 s(percent)= 3.24
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.444 min.
Rainfall intensity = 2.733(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.534
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 32.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
Initial subarea runoff = 4.929(CFS)
Total initial stream area = 3.380(Ac.)
Pervious area fraction = 0.800

++
Process from Point/Station 101.000 to Point/Station 102.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 21.663(CFS)
Depth of flow = 0.491(Ft.), Average velocity = 6.157(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	3.49
2	6.98	0.00
3	11.98	0.25
4	23.98	0.49

Manning's 'N' friction factor = 0.015

Sub-Channel flow = 21.663(CFS)
' ' flow top width = 17.981(Ft.)
' ' velocity= 6.157(Ft/s)
' ' area = 3.518(Sq.Ft)
' ' Froude number = 2.453

Upstream point elevation = 1665.000(Ft.)
Downstream point elevation = 1638.000(Ft.)
Flow length = 786.700(Ft.)
Travel time = 2.13 min.
Time of concentration = 16.57 min.
Depth of flow = 0.491(Ft.)
Average velocity = 6.157(Ft/s)
Total irregular channel flow = 21.663(CFS)
Irregular channel normal depth above invert elev. = 0.491(Ft.)
Average velocity of channel(s) = 6.157(Ft/s)
Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.794
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.800; Impervious fraction = 0.200
Rainfall intensity = 2.569(In/Hr) for a 100.0 year storm
Subarea runoff = 33.549(CFS) for 16.450(Ac.)
Total runoff = 38.478(CFS) Total area = 19.830(Ac.)
Depth of flow = 0.572(Ft.), Average velocity = 7.717(Ft/s)

++
Process from Point/Station 102.000 to Point/Station 103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1638.000(Ft.)
End of natural channel elevation = 1614.000(Ft.)
Length of natural channel = 1328.900(Ft.)
Estimated mean flow rate at midpoint of channel = 66.090(CFS)

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0181
Corrected/adjusted channel slope =  0.0181
Travel time =    3.93 min.     TC =   20.50  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.787
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.080
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.920
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.860; Impervious fraction =  0.140
Rainfall intensity =      2.335(In/Hr) for a   100.0 year storm
Subarea runoff =     52.308(CFS) for     28.460(Ac.)
Total runoff =     90.786(CFS)     Total area =      48.290(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1614.000(Ft.)
Downstream point/station elevation =  1612.000(Ft.)
Pipe length  =   182.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    90.786(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    90.786(CFS)
Normal flow depth in pipe =   34.13(In.)
Flow top width inside pipe =   25.80(In.)
Critical Depth =   35.25(In.)
Pipe flow velocity =     11.80(Ft/s)
Travel time through pipe =    0.26 min.
Time of concentration (TC) =    20.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.958(Ft.), Average velocity =   4.739(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     90.786(CFS)
  '     '         flow top width =     19.575(Ft.)
  '     '    velocity=    4.739(Ft/s)
  '     '         area =     19.159(Sq.Ft)
  '     '         Froude number =     0.844

Upstream point elevation =  1612.000(Ft.)
Downstream point elevation =  1611.000(Ft.)
Flow length =    76.000(Ft.)
Travel time  =    0.27 min.
Time of concentration =   21.02 min.
Depth of flow =   1.958(Ft.)
Average velocity =   4.739(Ft/s)
Total irregular channel flow =    90.786(CFS)
Irregular channel normal depth above invert elev. =   1.958(Ft.)
Average velocity of channel(s) =   4.739(Ft/s)


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Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1611.000(Ft.)
Downstream point/station elevation =  1610.000(Ft.)
Pipe length  =    70.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    90.786(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    90.786(CFS)
Normal flow depth in pipe =   29.63(In.)
Flow top width inside pipe =   33.33(In.)
Critical Depth =   35.25(In.)
Pipe flow velocity =     13.42(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    21.11 min.


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Process from Point/Station      106.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   1.823(Ft.), Average velocity =   5.465(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             3.00
        2            15.00             0.00
        3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     90.787(CFS)
  '     '         flow top width =     18.228(Ft.)
  '     '    velocity=    5.465(Ft/s)
  '     '         area =     16.613(Sq.Ft)
  '     '         Froude number =     1.009

Upstream point elevation =  1610.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   285.800(Ft.)
Travel time  =    0.87 min.
Time of concentration =   21.98 min.
Depth of flow =   1.823(Ft.)
```

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Average velocity =   5.465(Ft/s)
Total irregular channel flow =    90.786(CFS)
Irregular channel normal depth above invert elev. =   1.823(Ft.)
Average velocity of channel(s) =   5.465(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     48.290(Ac.)
Runoff from this stream =     90.786(CFS)
Time of concentration =   21.98 min.
Rainfall intensity =     2.262(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   811.600(Ft.)
Top (of initial area) elevation =  1650.000(Ft.)
Bottom (of initial area) elevation =  1631.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02341  s(percent)=       2.34
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.828 min.
Rainfall intensity =      2.701(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.798
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     14.878(CFS)
Total initial stream area =        6.900(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1631.000(Ft.)
End of natural channel elevation =   1613.000(Ft.)
Length of natural channel  =   872.300(Ft.)
Estimated mean flow rate at midpoint of channel =     25.529(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.60(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0206
Corrected/adjusted channel slope =  0.0206
Travel time =    3.16 min.     TC =   17.99  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.830; Impervious fraction =  0.170
Rainfall intensity =      2.476(In/Hr) for a   100.0 year storm
Subarea runoff =     19.486(CFS) for      9.880(Ac.)
Total runoff =     34.364(CFS)     Total area =      16.780(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     16.780(Ac.)
Runoff from this stream =     34.364(CFS)
Time of concentration =   17.99 min.
Rainfall intensity =     2.476(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   742.800(Ft.)
Top (of initial area) elevation =  1641.000(Ft.)
Bottom (of initial area) elevation =  1622.000(Ft.)
Difference in elevation =    19.000(Ft.)
Slope =    0.02558  s(percent)=       2.56
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.061 min.
Rainfall intensity =      2.766(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      2.989(CFS)
Total initial stream area =        1.350(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.287(Ft.), Average velocity =   1.817(Ft/s)
```

```
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
         1             0.00             3.00
         2            60.00             0.00
         3           120.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =      2.989(CFS)
  '     '          flow top width =     11.471(Ft.)
  '     '    velocity=    1.817(Ft/s)
  '     '          area =      1.645(Sq.Ft)
  '     '          Froude number =     0.846

Upstream point elevation =  1622.000(Ft.)
Downstream point elevation =  1613.000(Ft.)
Flow length =   368.000(Ft.)
Travel time  =    3.37 min.
Time of concentration =   17.44 min.
Depth of flow =   0.287(Ft.)
Average velocity =   1.817(Ft/s)
Total irregular channel flow =     2.989(CFS)
Irregular channel normal depth above invert elev. =   0.287(Ft.)
Average velocity of channel(s) =   1.817(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.350(Ac.)
Runoff from this stream =      2.989(CFS)
Time of concentration =   17.44 min.
Rainfall intensity =     2.511(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       34.364     17.99                2.476
2        2.989     17.44                2.511
Largest stream flow has longer time of concentration
Qp =     34.364 + sum of
           Qb         Ia/Ib
            2.989 *    0.986 =      2.947
Qp =     37.311

Total of 2 streams to confluence:
Flow rates before confluence point:
      34.364       2.989
Area of streams before confluence:
       16.780        1.350
Results of confluence:
Total flow rate =     37.311(CFS)
Time of concentration =    17.989 min.
Effective stream area after confluence =     18.130(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Depth of flow =   1.262(Ft.), Average velocity =   4.688(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
         1             0.00             3.00
         2            15.00             0.00
         3            30.00             3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =     37.311(CFS)
  '     '          flow top width =     12.617(Ft.)
  '     '    velocity=    4.688(Ft/s)
  '     '          area =      7.959(Sq.Ft)
  '     '          Froude number =     1.040

Upstream point elevation =  1613.000(Ft.)
Downstream point elevation =  1604.500(Ft.)
Flow length =   367.500(Ft.)
Travel time  =    1.31 min.
Time of concentration =   19.30 min.
Depth of flow =   1.262(Ft.)
Average velocity =   4.688(Ft/s)
Total irregular channel flow =    37.311(CFS)
Irregular channel normal depth above invert elev. =   1.262(Ft.)
Average velocity of channel(s) =   4.688(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      107.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.130(Ac.)
Runoff from this stream =     37.311(CFS)
Time of concentration =   19.30 min.
Rainfall intensity =     2.399(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       90.786     21.98           2.262
2       37.311     19.30           2.399
Largest stream flow has longer time of concentration
Qp =     90.786 + sum of
           Qb         Ia/Ib
           37.311 *    0.943 =     35.183
Qp =    125.970

Total of 2 main streams to confluence:
Flow rates before confluence point:
      90.786      37.311
```

```
Area of streams before confluence:
       48.290       18.130


Results of confluence:
Total flow rate =    125.970(CFS)
Time of concentration =    21.985 min.
Effective stream area after confluence  =     66.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1604.500(Ft.)
End of natural channel elevation =   1600.000(Ft.)
Length of natural channel  =   465.800(Ft.)
Estimated mean flow rate at midpoint of channel =    137.861(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.14(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    1.51 min.     TC =   23.49  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.765
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  74.70
Pervious area fraction =  0.880; Impervious fraction =  0.120
Rainfall intensity =      2.196(In/Hr) for a   100.0 year storm
Subarea runoff =     21.062(CFS) for     12.540(Ac.)
Total runoff =    147.032(CFS)     Total area =      78.960(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1600.000(Ft.)
Downstream point/station elevation =  1599.000(Ft.)
Pipe length  =    52.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   147.032(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   147.032(CFS)
Normal flow depth in pipe =   37.41(In.)
Flow top width inside pipe =   26.22(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.25(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    23.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   2.130(Ft.), Average velocity =   6.480(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              3.00
        2             15.00              0.00
        3             30.00              3.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------------
Sub-Channel flow  =    147.032(CFS)
  '     '         flow top width =     21.303(Ft.)
  '     '    velocity=    6.480(Ft/s)
  '     '         area =     22.692(Sq.Ft)
  '     '         Froude number =     1.106

Upstream point elevation =  1599.000(Ft.)
Downstream point elevation =  1586.000(Ft.)
Flow length =   591.500(Ft.)
Travel time  =    1.52 min.
Time of concentration =   25.07 min.
Depth of flow =   2.130(Ft.)
Average velocity =   6.480(Ft/s)
Total irregular channel flow =   147.032(CFS)
Irregular channel normal depth above invert elev. =   2.130(Ft.)
Average velocity of channel(s) =   6.480(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     78.960(Ac.)
Runoff from this stream =    147.032(CFS)
Time of concentration =   25.07 min.
Rainfall intensity =     2.133(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   527.800(Ft.)
Top (of initial area) elevation =  1635.000(Ft.)
Bottom (of initial area) elevation =  1623.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.02274  s(percent)=       2.27
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.865 min.
Rainfall intensity =      2.784(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.850
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.387(CFS)
Total initial stream area =        2.700(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1623.000(Ft.)
End of natural channel elevation =   1608.000(Ft.)
Length of natural channel  =   715.100(Ft.)
Estimated mean flow rate at midpoint of channel =     13.862(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0210
Corrected/adjusted channel slope =  0.0210
Travel time =    3.03 min.     TC =   16.89  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.547(In/Hr) for a   100.0 year storm
Subarea runoff =     13.608(CFS) for      6.320(Ac.)
Total runoff =     19.995(CFS)    Total area =       9.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1608.000(Ft.)
End of natural channel elevation =   1585.000(Ft.)
Length of natural channel  =  1275.000(Ft.)
Estimated mean flow rate at midpoint of channel =     36.056(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.74(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0180
Corrected/adjusted channel slope =  0.0180
Travel time =    4.49 min.     TC =   21.38  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.802
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.760
RI index for soil(AMC 2)  =  80.60
Pervious area fraction =  0.890; Impervious fraction =  0.110
Rainfall intensity =      2.291(In/Hr) for a   100.0 year storm
Subarea runoff =     26.610(CFS) for     14.490(Ac.)
Total runoff =     46.606(CFS)    Total area =      23.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     23.510(Ac.)
Runoff from this stream =     46.606(CFS)
Time of concentration =   21.38 min.
Rainfall intensity =     2.291(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      147.032     25.07                 2.133
2       46.606     21.38                 2.291
Largest stream flow has longer time of concentration
Qp =    147.032 + sum of
           Qb         Ia/Ib
           46.606 *    0.931 =     43.383
Qp =    190.415

Total of 2 streams to confluence:
Flow rates before confluence point:
     147.032      46.606
Area of streams before confluence:
       78.960       23.510
Results of confluence:
Total flow rate =    190.415(CFS)
Time of concentration =    25.070 min.
Effective stream area after confluence =    102.470(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.500
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
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Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  82.60
Pervious area fraction =  0.700; Impervious fraction =  0.300
Time of concentration =    25.07 min.
Rainfall intensity =      2.133(In/Hr) for a   100.0 year storm
Subarea runoff =      5.783(CFS) for      3.280(Ac.)
Total runoff =    196.197(CFS)    Total area =     105.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.500 to Point/Station      110.600
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1599.000(Ft.)
End of natural channel elevation =   1565.000(Ft.)
Length of natural channel  =   508.700(Ft.)
Estimated mean flow rate at midpoint of channel =    196.197(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  15.07(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0668
Corrected/adjusted channel slope =  0.0668
Travel time =    0.56 min.     TC =   25.63  min.


 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.111(In/Hr) for a   100.0 year storm
Subarea runoff =      0.000(CFS) for      0.000(Ac.)
Total runoff =    196.197(CFS)    Total area =     105.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    25.63 min.
Rainfall intensity =      2.111(In/Hr) for a   100.0 year storm
Subarea runoff =      4.239(CFS) for      2.270(Ac.)
Total runoff =    200.436(CFS)    Total area =     108.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    25.63 min.
Rainfall intensity =      2.111(In/Hr) for a   100.0 year storm
Subarea runoff =      2.857(CFS) for      1.820(Ac.)
Total runoff =    203.293(CFS)    Total area =     109.840(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.600 to Point/Station      110.700
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1565.000(Ft.)
End of natural channel elevation =   1564.000(Ft.)
Length of natural channel  =    77.200(Ft.)
Estimated mean flow rate at midpoint of channel =    203.293(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.71(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0130
Corrected/adjusted channel slope =  0.0130
Travel time =    0.19 min.     TC =   25.82  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.104(In/Hr) for a   100.0 year storm
Subarea runoff =      0.000(CFS) for      0.000(Ac.)
Total runoff =    203.293(CFS)    Total area =     109.840(Ac.)


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Process from Point/Station      110.700 to Point/Station      110.700
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    25.82 min.
Rainfall intensity =      2.104(In/Hr) for a   100.0 year storm
Subarea runoff =      3.201(CFS) for      1.720(Ac.)
Total runoff =    206.494(CFS)     Total area =     111.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.700 to Point/Station      110.700
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    25.82 min.
Rainfall intensity =      2.104(In/Hr) for a   100.0 year storm
Subarea runoff =      0.279(CFS) for      0.150(Ac.)
Total runoff =    206.773(CFS)     Total area =     111.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.700 to Point/Station      111.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________
Top of natural channel elevation =   1564.000(Ft.)
End of natural channel elevation =   1562.200(Ft.)
Length of natural channel  =   184.900(Ft.)
Estimated mean flow rate at midpoint of channel =    214.649(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.91(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0097
Corrected/adjusted channel slope =  0.0097
Travel time =    0.52 min.     TC =   26.35  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.086(In/Hr) for a   100.0 year storm
Subarea runoff =     14.803(CFS) for      8.510(Ac.)
Total runoff =    221.576(CFS)     Total area =     120.220(Ac.)
End of computations, total study area =          120.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.841
Area averaged RI index number =  77.3
```

DRAINAGE AREAS
B, C, D, F, I, &J

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/01/25  File:CRPROB100.out
------------------------------------------------------------------------
Crescent Gardens
PROPOSED CONDITION HYDROLOGY
AREAS B,C,D,F,I & J
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.440(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      311.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   545.200(Ft.)
Top (of initial area) elevation =  1642.000(Ft.)
Bottom (of initial area) elevation =  1621.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.03852  s(percent)=       3.85
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.641 min.
Rainfall intensity =      2.902(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.979(CFS)
```

Area B

```
Total initial stream area =        1.610(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      312.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1621.000(Ft.)
End of natural channel elevation =   1607.000(Ft.)
Length of natural channel  =   534.000(Ft.)
Estimated mean flow rate at midpoint of channel =      6.451(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.63(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0262
Corrected/adjusted channel slope =  0.0262
Travel time =    2.45 min.     TC =   15.09  min.


 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.795
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.770
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.230
RI index for soil(AMC 2)  =  79.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.680(In/Hr) for a   100.0 year storm
Subarea runoff =      4.260(CFS) for      2.000(Ac.)
Total runoff =      8.239(CFS)     Total area =       3.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   543.400(Ft.)
Top (of initial area) elevation =  1613.000(Ft.)
Bottom (of initial area) elevation =  1604.000(Ft.)
Difference in elevation =     9.000(Ft.)
Slope =    0.01656  s(percent)=       1.66
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.945 min.
Rainfall intensity =      2.692(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.799
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.160
RI index for soil(AMC 2)  =  79.76
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.971(CFS)
```

Area C

```
Total initial stream area =        2.310(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      510.000 to Point/Station      511.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   153.100(Ft.)
Top (of initial area) elevation =  1643.000(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    29.000(Ft.)
Slope =    0.18942  s(percent)=      18.94
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.531 min.
Rainfall intensity =      4.210(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.188(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   849.100(Ft.)
Top (of initial area) elevation =  1665.000(Ft.)
Bottom (of initial area) elevation =  1576.000(Ft.)
Difference in elevation =    89.000(Ft.)
Slope =    0.10482  s(percent)=      10.48
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.353 min.
Rainfall intensity =      2.932(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.260
Decimal fraction soil group D = 0.740
RI index for soil(AMC 2)  =  88.22
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     11.495(CFS)
Total initial stream area =        4.620(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of natural channel elevation =   1576.000(Ft.)
End of natural channel elevation =   1540.000(Ft.)
```

Area D

Area F

```
Length of natural channel  =  1005.700(Ft.)
Estimated mean flow rate at midpoint of channel =     34.536(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.59(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0358
Corrected/adjusted channel slope =  0.0358
Travel time =    2.54 min.     TC =   14.90  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.696(In/Hr) for a   100.0 year storm
Subarea runoff =     42.341(CFS) for     18.520(Ac.)
Total runoff =     53.836(CFS)     Total area =      23.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      631.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   881.300(Ft.)
Top (of initial area) elevation =  1576.000(Ft.)
Bottom (of initial area) elevation =  1540.000(Ft.)
Difference in elevation =    36.000(Ft.)
Slope =    0.04085  s(percent)=       4.08
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   20.280 min.
Rainfall intensity =      2.346(In/Hr) for a   100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.812
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  84.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.193(CFS)
Total initial stream area =        4.300(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      621.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   325.800(Ft.)
Top (of initial area) elevation =  1571.000(Ft.)
```

Area I

Area J

```
Bottom (of initial area) elevation =  1537.000(Ft.)
Difference in elevation =    34.000(Ft.)
Slope =    0.10436  s(percent)=      10.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.429 min.
Rainfall intensity =      3.483(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.088(CFS)
Total initial stream area =        1.700(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =           35.66 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  87.1
```

DRAINAGE AREA E

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/01/25  File:crproe100.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condition Hydrology
AREA E
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.440(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   997.400(Ft.)
Top (of initial area) elevation =  1645.400(Ft.)
Bottom (of initial area) elevation =  1614.000(Ft.)
Difference in elevation =    31.400(Ft.)
Slope =    0.03148  s(percent)=       3.15
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.177 min.
Rainfall intensity =      2.673(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.797
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      9.825(CFS)
Total initial stream area =        4.610(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1607.000(Ft.)
Downstream point/station elevation =  1582.000(Ft.)
Pipe length  =  1200.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.825(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.825(CFS)
Normal flow depth in pipe =   10.55(In.)
Flow top width inside pipe =   17.73(In.)
Critical Depth =   14.50(In.)
Pipe flow velocity =      9.13(Ft/s)
Travel time through pipe =    2.19 min.
Time of concentration (TC) =    17.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      502.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.280
Decimal fraction soil group D = 0.720
RI index for soil(AMC 2)  =  76.20
Pervious area fraction =  0.900; Impervious fraction =  0.100
Time of concentration =    17.37 min.
Rainfall intensity =      2.516(In/Hr) for a   100.0 year storm
Subarea runoff =     21.839(CFS) for     11.060(Ac.)
Total runoff =     31.664(CFS)     Total area =      15.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1582.000(Ft.)
Downstream point/station elevation =  1580.000(Ft.)
Pipe length  =   225.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    31.664(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    31.664(CFS)
Normal flow depth in pipe =   20.67(In.)
Flow top width inside pipe =   27.77(In.)
Critical Depth =   22.99(In.)
Pipe flow velocity =      8.78(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    17.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      503.000
```

```
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.802
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.270
Decimal fraction soil group D = 0.730
RI index for soil(AMC 2)  =  81.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    17.80 min.
Rainfall intensity =      2.488(In/Hr) for a   100.0 year storm
Subarea runoff =     33.057(CFS) for     16.570(Ac.)
Total runoff =     64.721(CFS)    Total area =      32.240(Ac.)
End of computations, total study area =           32.24 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.937
Area averaged RI index number =  78.7
```

DRAINAGE AREA G

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 10/17/23  File:crprog100r.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condtion Hydrology
Area G
10/17/23
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.440(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   770.300(Ft.)
Top (of initial area) elevation =  1610.900(Ft.)
Bottom (of initial area) elevation =  1570.000(Ft.)
Difference in elevation =    40.900(Ft.)
Slope =    0.05310  s(percent)=       5.31
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.787 min.
Rainfall intensity =      3.117(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      4.749(CFS)
Total initial stream area =        1.830(Ac.)
Pervious area fraction = 0.600


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1570.000(Ft.)
End of street segment elevation =  1557.200(Ft.)
Length of street segment  =   278.400(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.000(Ft.)
Distance from crown to crossfall grade break  =  10.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   4.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     11.767(CFS)
Depth of flow =   0.337(Ft.), Average velocity =   5.755(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.159(Ft.)
Flow velocity =   5.75(Ft/s)
Travel time =    0.81 min.     TC =   11.59  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  79.00
Pervious area fraction =  0.850; Impervious fraction =  0.150
Rainfall intensity =      3.017(In/Hr) for a   100.0 year storm
Subarea runoff =     13.948(CFS) for      5.640(Ac.)
Total runoff =     18.697(CFS)     Total area =       7.470(Ac.)
Street flow at end of street =     18.697(CFS)
Half street flow at end of street =     18.697(CFS)
Depth of flow =   0.388(Ft.), Average velocity =   6.594(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  16.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      402.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1553.500(Ft.)
Downstream point/station elevation =  1553.000(Ft.)
Pipe length  =    43.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.697(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    18.697(CFS)
Normal flow depth in pipe =   15.82(In.)
```

```
Flow top width inside pipe =   22.75(In.)
Critical Depth =   18.68(In.)
Pipe flow velocity =      8.52(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    11.68 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1553.000(Ft.)
End of natural channel elevation =   1544.500(Ft.)
Length of natural channel  =   544.100(Ft.)
Estimated mean flow rate at midpoint of channel =     30.374(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.20(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0156
Corrected/adjusted channel slope =  0.0156
Travel time =    2.16 min.     TC =   13.84  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.786(In/Hr) for a   100.0 year storm
Subarea runoff =     22.091(CFS) for      9.330(Ac.)
Total runoff =     40.789(CFS)    Total area =      16.800(Ac.)
End of computations, total study area =           16.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.906
Area averaged RI index number =  84.1
```

DRAINAGE AREA H

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                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 01/01/25  File:CRPROH100.out
------------------------------------------------------------------------
Crescent Gardens
Proposed Condition Hydrology
AREA H
01/02/25
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6406

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.486(In.)
100 year, 1 hour precipitation =  1.440(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.440(In/Hr)
Slope of intensity duration curve = 0.4500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      610.500
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   746.900(Ft.)
Top (of initial area) elevation =  1600.500(Ft.)
Bottom (of initial area) elevation =  1577.000(Ft.)
Difference in elevation =    23.500(Ft.)
Slope =    0.03146  s(percent)=       3.15
TC = k(0.420)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.830 min.
Rainfall intensity =      2.990(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/2 Acre Lot)
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Initial subarea runoff =      3.549(CFS)
Total initial stream area =        1.430(Ac.)
Pervious area fraction = 0.600


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.500 to Point/Station      610.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1573.000(Ft.)
Downstream point/station elevation =  1551.000(Ft.)
Pipe length  =   619.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.549(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.549(CFS)
Normal flow depth in pipe =    6.20(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    9.65(In.)
Pipe flow velocity =      8.67(Ft/s)
Travel time through pipe =    1.19 min.
Time of concentration (TC) =    13.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.600 to Point/Station      610.600
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
USER INPUT of soil data for subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  79.10
Pervious area fraction =  0.840; Impervious fraction =  0.160
Time of concentration =    13.02 min.
Rainfall intensity =      2.864(In/Hr) for a   100.0 year storm
Subarea runoff =     13.269(CFS) for      5.670(Ac.)
Total runoff =     16.818(CFS)     Total area =       7.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.600 to Point/Station      611.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1551.000(Ft.)
Downstream point/station elevation =  1544.500(Ft.)
Pipe length  =   304.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.818(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.818(CFS)
Normal flow depth in pipe =   13.27(In.)
Flow top width inside pipe =   20.26(In.)
Critical Depth =   18.06(In.)
Pipe flow velocity =     10.50(Ft/s)
Travel time through pipe =    0.48 min.
Time of concentration (TC) =    13.50 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      611.000 to Point/Station      612.000
```
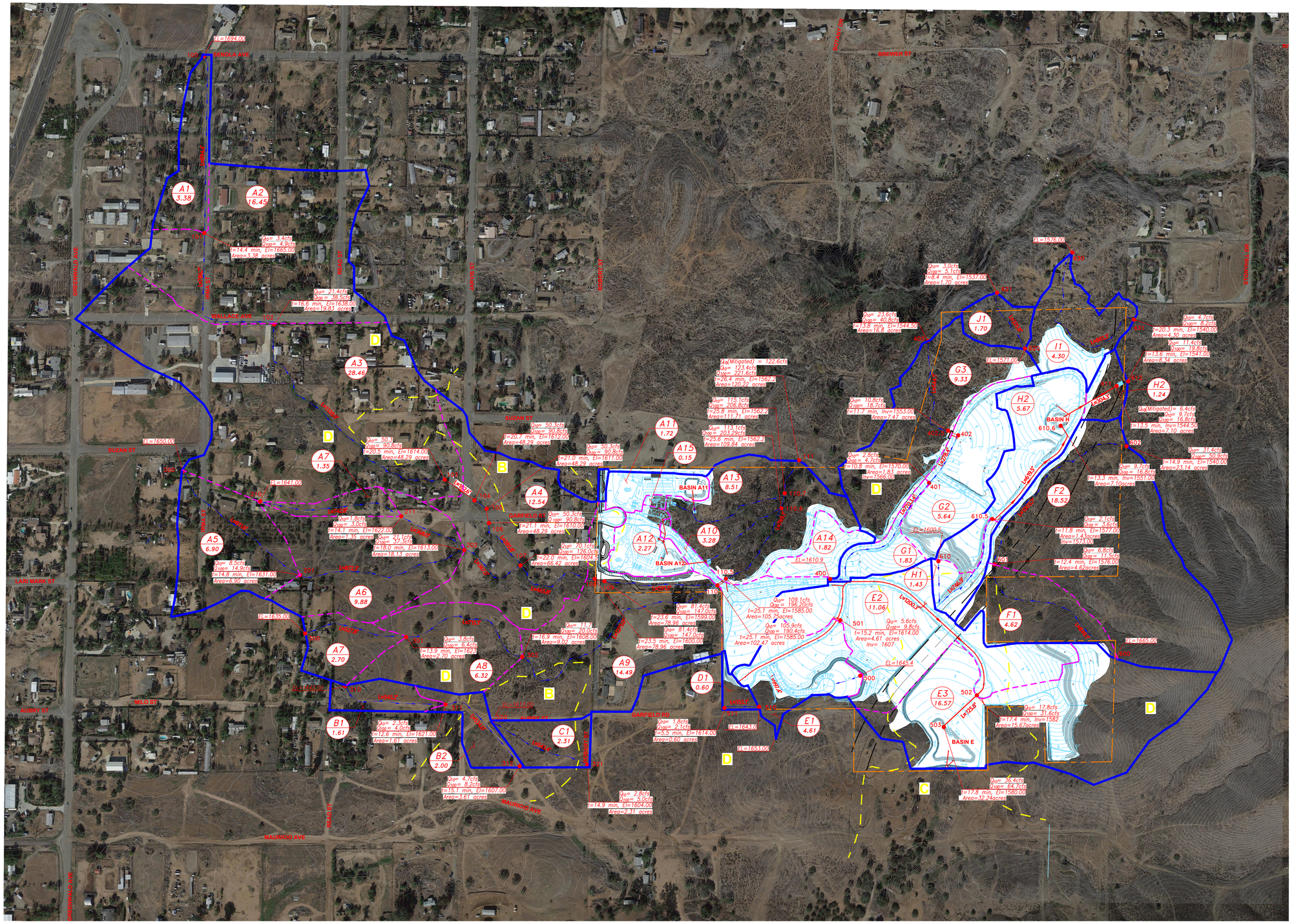

```
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________
Top of natural channel elevation =   1544.500(Ft.)
End of natural channel elevation =   1541.000(Ft.)
Length of natural channel  =    58.000(Ft.)
Estimated mean flow rate at midpoint of channel =     18.287(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.19(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
         Normal channel slope =  0.0603
Corrected/adjusted channel slope =  0.0603
Travel time =    0.13 min.     TC =   13.64  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.805(In/Hr) for a   100.0 year storm
Subarea runoff =      2.956(CFS) for      1.240(Ac.)
Total runoff =     19.775(CFS)     Total area =       8.340(Ac.)
End of computations, total study area =            8.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.823
Area averaged RI index number =  79.9
```

HYDROLOGY MAP



LEGEND

- D / 3.0 — DRAINAGE AREA DESIGNATION / ACREAGE
- MAJOR DRAINAGE AREA BOUNDARY
- SUBAREA DRAINAGE BOUNDARY
- PROPOSED STORM DRAIN
- FLOW LINE (SURFACE FLOW)
- FLOW LINE (PIPE FLOW)
- 1 — NODE & NODE #
- HYDROLOGIC SOILS GROUP BOUNDARY
- PROPERTY BOUNDARY

FEET 0 100 200 400
INCHES 0 1/2 1 2

REVISION	
DATE	DESCRIPTION

APPLICANT:
CLIENT NAME
CLIENT ADDRESS
CITY, STATE ZIP
PH: (000) 000-0000

PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

CRESCENT GARDENS, CITY OF LAKE ELSINORE

HYDROLOGY MAP
PROPOSED CONDITIONS

DESIGNED BY: BJS
DRAFTED BY: BJS
CHECKED BY: MR
DATE: 06/08/2022
SHEET 1
W.O.: 4427-1

DATE: Jan. 02, 2025 08:16:23 AM FILE: \\ASHUR\Projects\1167\Engineering\SY_Hydrology\Crescent Gardens Proposed Hydrology-Rev3 2025-0102.dwg

SECTION 4
EXISTING & PROPOSED CONDITION HYDROLOGY
UNIT HYDROGRAPH METHOD ANALYSIS

UNIT HYDROGRAPH RESULTS EXISTING CONDITION (10-YEAR, 24HR STORM)

DRAINAGE AREA A

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/16/23 File: crea10uh2410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6406

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

CRESCENT GARDENS
Existing Condition
Area A
10/16/23

Drainage Area = 119.92(Ac.) = 0.187 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 119.92(Ac.) = 0.187 Sq. Mi.
Length along longest watercourse = 5504.00(Ft.)
Length along longest watercourse measured to centroid = 2594.00(Ft.)
Length along longest watercourse = 1.042 Mi.
Length along longest watercourse measured to centroid = 0.491 Mi.
Difference in elevation = 131.80(Ft.)
Slope along watercourse = 126.4360 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.223 Hr.
Lag time = 13.36 Min.
25% of lag time = 3.34 Min.
40% of lag time = 5.34 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
119.92	2.21	265.02

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
119.92	5.82	697.93

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.210(In)
Area Averaged 100-Year Rainfall = 5.820(In)

Point rain (area averaged) = 3.695(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 3.694(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
119.920	78.10	0.118

Total Area Entered = 119.92(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
78.1	78.1	0.266	0.118	0.238	1.000	0.238
					Sum (F) =	0.238

Area averaged mean soil loss (F) (In/Hr) = 0.238
Minimum soil loss rate ((In/Hr)) = 0.119
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.806

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	37.435	3.948	4.772
2	0.167	74.870	15.900	19.217
3	0.250	112.305	25.143	30.387
4	0.333	149.740	18.667	22.560
5	0.417	187.175	9.371	11.326
6	0.500	224.610	5.615	6.787
7	0.583	262.045	4.164	5.032
8	0.667	299.480	3.270	3.952
9	0.750	336.914	2.513	3.037
10	0.833	374.349	2.119	2.561
11	0.917	411.784	1.661	2.008
12	1.000	449.219	1.303	1.575
13	1.083	486.654	1.162	1.404
14	1.167	524.089	1.061	1.282
15	1.250	561.524	0.836	1.010
16	1.333	598.959	0.710	0.858
17	1.417	636.394	0.603	0.729
18	1.500	673.829	0.494	0.597
19	1.583	711.264	0.384	0.464
20	1.667	748.699	0.374	0.452
21	1.750	786.134	0.374	0.452
22	1.833	823.569	0.326	0.394
			Sum = 100.000	Sum= 120.857

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	(0.422)	0.024	0.006
2	0.17	0.07	0.030	(0.420)	0.024	0.006
3	0.25	0.07	0.030	(0.419)	0.024	0.006
4	0.33	0.10	0.044	(0.417)	0.036	0.009
5	0.42	0.10	0.044	(0.416)	0.036	0.009
6	0.50	0.10	0.044	(0.414)	0.036	0.009
7	0.58	0.10	0.044	(0.412)	0.036	0.009
8	0.67	0.10	0.044	(0.411)	0.036	0.009
9	0.75	0.10	0.044	(0.409)	0.036	0.009
10	0.83	0.13	0.059	(0.408)	0.048	0.011
11	0.92	0.13	0.059	(0.406)	0.048	0.011
12	1.00	0.13	0.059	(0.404)	0.048	0.011
13	1.08	0.10	0.044	(0.403)	0.036	0.009
14	1.17	0.10	0.044	(0.401)	0.036	0.009
15	1.25	0.10	0.044	(0.400)	0.036	0.009
16	1.33	0.10	0.044	(0.398)	0.036	0.009
17	1.42	0.10	0.044	(0.396)	0.036	0.009
18	1.50	0.10	0.044	(0.395)	0.036	0.009
19	1.58	0.10	0.044	(0.393)	0.036	0.009
20	1.67	0.10	0.044	(0.392)	0.036	0.009
21	1.75	0.10	0.044	(0.390)	0.036	0.009
22	1.83	0.13	0.059	(0.389)	0.048	0.011
23	1.92	0.13	0.059	(0.387)	0.048	0.011
24	2.00	0.13	0.059	(0.385)	0.048	0.011
25	2.08	0.13	0.059	(0.384)	0.048	0.011
26	2.17	0.13	0.059	(0.382)	0.048	0.011
27	2.25	0.13	0.059	(0.381)	0.048	0.011
28	2.33	0.13	0.059	(0.379)	0.048	0.011
29	2.42	0.13	0.059	(0.378)	0.048	0.011
30	2.50	0.13	0.059	(0.376)	0.048	0.011
31	2.58	0.17	0.074	(0.375)	0.060	0.014
32	2.67	0.17	0.074	(0.373)	0.060	0.014
33	2.75	0.17	0.074	(0.371)	0.060	0.014
34	2.83	0.17	0.074	(0.370)	0.060	0.014
35	2.92	0.17	0.074	(0.368)	0.060	0.014
36	3.00	0.17	0.074	(0.367)	0.060	0.014
37	3.08	0.17	0.074	(0.365)	0.060	0.014
38	3.17	0.17	0.074	(0.364)	0.060	0.014
39	3.25	0.17	0.074	(0.362)	0.060	0.014
40	3.33	0.17	0.074	(0.361)	0.060	0.014
41	3.42	0.17	0.074	(0.359)	0.060	0.014
42	3.50	0.17	0.074	(0.358)	0.060	0.014
43	3.58	0.17	0.074	(0.356)	0.060	0.014
44	3.67	0.17	0.074	(0.355)	0.060	0.014
45	3.75	0.17	0.074	(0.353)	0.060	0.014
46	3.83	0.20	0.089	(0.352)	0.071	0.017
47	3.92	0.20	0.089	(0.350)	0.071	0.017
48	4.00	0.20	0.089	(0.349)	0.071	0.017
49	4.08	0.20	0.089	(0.347)	0.071	0.017
50	4.17	0.20	0.089	(0.346)	0.071	0.017
51	4.25	0.20	0.089	(0.344)	0.071	0.017
52	4.33	0.23	0.103	(0.343)	0.083	0.020
53	4.42	0.23	0.103	(0.342)	0.083	0.020
54	4.50	0.23	0.103	(0.340)	0.083	0.020
55	4.58	0.23	0.103	(0.339)	0.083	0.020
56	4.67	0.23	0.103	(0.337)	0.083	0.020
57	4.75	0.23	0.103	(0.336)	0.083	0.020
58	4.83	0.27	0.118	(0.334)	0.095	0.023
59	4.92	0.27	0.118	(0.333)	0.095	0.023
60	5.00	0.27	0.118	(0.331)	0.095	0.023
61	5.08	0.20	0.089	(0.330)	0.071	0.017
62	5.17	0.20	0.089	(0.328)	0.071	0.017
63	5.25	0.20	0.089	(0.327)	0.071	0.017
64	5.33	0.23	0.103	(0.326)	0.083	0.020
65	5.42	0.23	0.103	(0.324)	0.083	0.020
66	5.50	0.23	0.103	(0.323)	0.083	0.020
67	5.58	0.27	0.118	(0.321)	0.095	0.023
68	5.67	0.27	0.118	(0.320)	0.095	0.023
69	5.75	0.27	0.118	(0.319)	0.095	0.023
70	5.83	0.27	0.118	(0.317)	0.095	0.023
71	5.92	0.27	0.118	(0.316)	0.095	0.023
72	6.00	0.27	0.118	(0.314)	0.095	0.023
73	6.08	0.30	0.133	(0.313)	0.107	0.026
74	6.17	0.30	0.133	(0.312)	0.107	0.026
75	6.25	0.30	0.133	(0.310)	0.107	0.026
76	6.33	0.30	0.133	(0.309)	0.107	0.026
77	6.42	0.30	0.133	(0.307)	0.107	0.026
78	6.50	0.30	0.133	(0.306)	0.107	0.026
79	6.58	0.33	0.148	(0.305)	0.119	0.029
80	6.67	0.33	0.148	(0.303)	0.119	0.029
81	6.75	0.33	0.148	(0.302)	0.119	0.029
82	6.83	0.33	0.148	(0.301)	0.119	0.029
83	6.92	0.33	0.148	(0.299)	0.119	0.029
84	7.00	0.33	0.148	(0.298)	0.119	0.029
85	7.08	0.33	0.148	(0.296)	0.119	0.029
86	7.17	0.33	0.148	(0.295)	0.119	0.029
87	7.25	0.33	0.148	(0.294)	0.119	0.029
88	7.33	0.37	0.163	(0.292)	0.131	0.032
89	7.42	0.37	0.163	(0.291)	0.131	0.032
90	7.50	0.37	0.163	(0.290)	0.131	0.032
91	7.58	0.40	0.177	(0.288)	0.143	0.034
92	7.67	0.40	0.177	(0.287)	0.143	0.034
93	7.75	0.40	0.177	(0.286)	0.143	0.034
94	7.83	0.43	0.192	(0.284)	0.155	0.037
95	7.92	0.43	0.192	(0.283)	0.155	0.037
96	8.00	0.43	0.192	(0.282)	0.155	0.037
97	8.08	0.50	0.222	(0.281)	0.179	0.043
98	8.17	0.50	0.222	(0.279)	0.179	0.043
99	8.25	0.50	0.222	(0.278)	0.179	0.043
100	8.33	0.50	0.222	(0.277)	0.179	0.043
101	8.42	0.50	0.222	(0.275)	0.179	0.043
102	8.50	0.50	0.222	(0.274)	0.179	0.043
103	8.58	0.53	0.236	(0.273)	0.190	0.046
104	8.67	0.53	0.236	(0.271)	0.190	0.046
105	8.75	0.53	0.236	(0.270)	0.190	0.046
106	8.83	0.57	0.251	(0.269)	0.202	0.049
107	8.92	0.57	0.251	(0.268)	0.202	0.049
108	9.00	0.57	0.251	(0.266)	0.202	0.049
109	9.08	0.63	0.281	(0.265)	0.226	0.055
110	9.17	0.63	0.281	(0.264)	0.226	0.055
111	9.25	0.63	0.281	(0.263)	0.226	0.055
112	9.33	0.67	0.296	(0.261)	0.238	0.057
113	9.42	0.67	0.296	(0.260)	0.238	0.057
114	9.50	0.67	0.296	(0.259)	0.238	0.057
115	9.58	0.70	0.310	(0.258)	0.250	0.060
116	9.67	0.70	0.310	(0.256)	0.250	0.060
117	9.75	0.70	0.310	(0.255)	0.250	0.060

118	9.83	0.73	0.325		0.254	(0.262)	0.071	178	14.83	0.83	0.369		0.188	(0.298)	0.182
119	9.92	0.73	0.325		0.253	(0.262)	0.072	179	14.92	0.83	0.369		0.187	(0.298)	0.182
120	10.00	0.73	0.325		0.251	(0.262)	0.074	180	15.00	0.83	0.369		0.186	(0.298)	0.183
121	10.08	0.50	0.222	(0.250)		0.179	0.043	181	15.08	0.80	0.355		0.185	(0.286)	0.170
122	10.17	0.50	0.222	(0.249)		0.179	0.043	182	15.17	0.80	0.355		0.184	(0.286)	0.171
123	10.25	0.50	0.222	(0.248)		0.179	0.043	183	15.25	0.80	0.355		0.183	(0.286)	0.172
124	10.33	0.50	0.222	(0.247)		0.179	0.043	184	15.33	0.77	0.340		0.182	(0.274)	0.158
125	10.42	0.50	0.222	(0.245)		0.179	0.043	185	15.42	0.77	0.340		0.181	(0.274)	0.159
126	10.50	0.50	0.222	(0.244)		0.179	0.043	186	15.50	0.77	0.340		0.180	(0.274)	0.160
127	10.58	0.67	0.296	(0.243)		0.238	0.057	187	15.58	0.63	0.281		0.179	(0.226)	0.101
128	10.67	0.67	0.296	(0.242)		0.238	0.057	188	15.67	0.63	0.281		0.178	(0.226)	0.102
129	10.75	0.67	0.296	(0.241)		0.238	0.057	189	15.75	0.63	0.281		0.178	(0.226)	0.103
130	10.83	0.67	0.296	(0.239)		0.238	0.057	190	15.83	0.63	0.281		0.177	(0.226)	0.104
131	10.92	0.67	0.296	(0.238)		0.238	0.057	191	15.92	0.63	0.281		0.176	(0.226)	0.105
132	11.00	0.67	0.296		0.237	(0.238)	0.058	192	16.00	0.63	0.281		0.175	(0.226)	0.106
133	11.08	0.63	0.281	(0.236)		0.226	0.055	193	16.08	0.13	0.059	(0.174)		0.048	0.011
134	11.17	0.63	0.281	(0.235)		0.226	0.055	194	16.17	0.13	0.059	(0.173)		0.048	0.011
135	11.25	0.63	0.281	(0.234)		0.226	0.055	195	16.25	0.13	0.059	(0.172)		0.048	0.011
136	11.33	0.63	0.281	(0.232)		0.226	0.055	196	16.33	0.13	0.059	(0.171)		0.048	0.011
137	11.42	0.63	0.281	(0.231)		0.226	0.055	197	16.42	0.13	0.059	(0.170)		0.048	0.011
138	11.50	0.63	0.281	(0.230)		0.226	0.055	198	16.50	0.13	0.059	(0.170)		0.048	0.011
139	11.58	0.57	0.251	(0.229)		0.202	0.049	199	16.58	0.10	0.044	(0.169)		0.036	0.009
140	11.67	0.57	0.251	(0.228)		0.202	0.049	200	16.67	0.10	0.044	(0.168)		0.036	0.009
141	11.75	0.57	0.251	(0.227)		0.202	0.049	201	16.75	0.10	0.044	(0.167)		0.036	0.009
142	11.83	0.60	0.266	(0.226)		0.214	0.052	202	16.83	0.10	0.044	(0.166)		0.036	0.009
143	11.92	0.60	0.266	(0.225)		0.214	0.052	203	16.92	0.10	0.044	(0.165)		0.036	0.009
144	12.00	0.60	0.266	(0.223)		0.214	0.052	204	17.00	0.10	0.044	(0.164)		0.036	0.009
145	12.08	0.83	0.369		0.222	(0.298)	0.147	205	17.08	0.17	0.074	(0.164)		0.060	0.014
146	12.17	0.83	0.369		0.221	(0.298)	0.148	206	17.17	0.17	0.074	(0.163)		0.060	0.014
147	12.25	0.83	0.369		0.220	(0.298)	0.149	207	17.25	0.17	0.074	(0.162)		0.060	0.014
148	12.33	0.87	0.384		0.219	(0.310)	0.165	208	17.33	0.17	0.074	(0.161)		0.060	0.014
149	12.42	0.87	0.384		0.218	(0.310)	0.166	209	17.42	0.17	0.074	(0.160)		0.060	0.014
150	12.50	0.87	0.384		0.217	(0.310)	0.167	210	17.50	0.17	0.074	(0.160)		0.060	0.014
151	12.58	0.93	0.414		0.216	(0.333)	0.198	211	17.58	0.17	0.074	(0.159)		0.060	0.014
152	12.67	0.93	0.414		0.215	(0.333)	0.199	212	17.67	0.17	0.074	(0.158)		0.060	0.014
153	12.75	0.93	0.414		0.214	(0.333)	0.200	213	17.75	0.17	0.074	(0.157)		0.060	0.014
154	12.83	0.97	0.429		0.212	(0.345)	0.216	214	17.83	0.13	0.059	(0.156)		0.048	0.011
155	12.92	0.97	0.429		0.211	(0.345)	0.217	215	17.92	0.13	0.059	(0.156)		0.048	0.011
156	13.00	0.97	0.429		0.210	(0.345)	0.218	216	18.00	0.13	0.059	(0.155)		0.048	0.011
157	13.08	1.13	0.502		0.209	(0.405)	0.293	217	18.08	0.13	0.059	(0.154)		0.048	0.011
158	13.17	1.13	0.502		0.208	(0.405)	0.294	218	18.17	0.13	0.059	(0.153)		0.048	0.011
159	13.25	1.13	0.502		0.207	(0.405)	0.295	219	18.25	0.13	0.059	(0.153)		0.048	0.011
160	13.33	1.13	0.502		0.206	(0.405)	0.296	220	18.33	0.13	0.059	(0.152)		0.048	0.011
161	13.42	1.13	0.502		0.205	(0.405)	0.297	221	18.42	0.13	0.059	(0.151)		0.048	0.011
162	13.50	1.13	0.502		0.204	(0.405)	0.298	222	18.50	0.13	0.059	(0.150)		0.048	0.011
163	13.58	0.77	0.340		0.203	(0.274)	0.137	223	18.58	0.10	0.044	(0.150)		0.036	0.009
164	13.67	0.77	0.340		0.202	(0.274)	0.138	224	18.67	0.10	0.044	(0.149)		0.036	0.009
165	13.75	0.77	0.340		0.201	(0.274)	0.139	225	18.75	0.10	0.044	(0.148)		0.036	0.009
166	13.83	0.77	0.340		0.200	(0.274)	0.140	226	18.83	0.07	0.030	(0.148)		0.024	0.006
167	13.92	0.77	0.340		0.199	(0.274)	0.141	227	18.92	0.07	0.030	(0.147)		0.024	0.006
168	14.00	0.77	0.340		0.198	(0.274)	0.142	228	19.00	0.07	0.030	(0.146)		0.024	0.006
169	14.08	0.90	0.399		0.197	(0.321)	0.202	229	19.08	0.10	0.044	(0.145)		0.036	0.009
170	14.17	0.90	0.399		0.196	(0.321)	0.203	230	19.17	0.10	0.044	(0.145)		0.036	0.009
171	14.25	0.90	0.399		0.195	(0.321)	0.204	231	19.25	0.10	0.044	(0.144)		0.036	0.009
172	14.33	0.87	0.384		0.194	(0.310)	0.190	232	19.33	0.13	0.059	(0.143)		0.048	0.011
173	14.42	0.87	0.384		0.193	(0.310)	0.191	233	19.42	0.13	0.059	(0.143)		0.048	0.011
174	14.50	0.87	0.384		0.192	(0.310)	0.192	234	19.50	0.13	0.059	(0.142)		0.048	0.011
175	14.58	0.87	0.384		0.191	(0.310)	0.193	235	19.58	0.10	0.044	(0.141)		0.036	0.009
176	14.67	0.87	0.384		0.190	(0.310)	0.194	236	19.67	0.10	0.044	(0.141)		0.036	0.009
177	14.75	0.87	0.384		0.189	(0.310)	0.195	237	19.75	0.10	0.044	(0.140)		0.036	0.009

238	19.83	0.07	0.030	(0.140)	0.024	0.006
239	19.92	0.07	0.030	(0.139)	0.024	0.006
240	20.00	0.07	0.030	(0.138)	0.024	0.006
241	20.08	0.10	0.044	(0.138)	0.036	0.009
242	20.17	0.10	0.044	(0.137)	0.036	0.009
243	20.25	0.10	0.044	(0.136)	0.036	0.009
244	20.33	0.10	0.044	(0.136)	0.036	0.009
245	20.42	0.10	0.044	(0.135)	0.036	0.009
246	20.50	0.10	0.044	(0.135)	0.036	0.009
247	20.58	0.10	0.044	(0.134)	0.036	0.009
248	20.67	0.10	0.044	(0.134)	0.036	0.009
249	20.75	0.10	0.044	(0.133)	0.036	0.009
250	20.83	0.07	0.030	(0.132)	0.024	0.006
251	20.92	0.07	0.030	(0.132)	0.024	0.006
252	21.00	0.07	0.030	(0.131)	0.024	0.006
253	21.08	0.10	0.044	(0.131)	0.036	0.009
254	21.17	0.10	0.044	(0.130)	0.036	0.009
255	21.25	0.10	0.044	(0.130)	0.036	0.009
256	21.33	0.07	0.030	(0.129)	0.024	0.006
257	21.42	0.07	0.030	(0.129)	0.024	0.006
258	21.50	0.07	0.030	(0.128)	0.024	0.006
259	21.58	0.10	0.044	(0.128)	0.036	0.009
260	21.67	0.10	0.044	(0.127)	0.036	0.009
261	21.75	0.10	0.044	(0.127)	0.036	0.009
262	21.83	0.07	0.030	(0.127)	0.024	0.006
263	21.92	0.07	0.030	(0.126)	0.024	0.006
264	22.00	0.07	0.030	(0.126)	0.024	0.006
265	22.08	0.10	0.044	(0.125)	0.036	0.009
266	22.17	0.10	0.044	(0.125)	0.036	0.009
267	22.25	0.10	0.044	(0.125)	0.036	0.009
268	22.33	0.07	0.030	(0.124)	0.024	0.006
269	22.42	0.07	0.030	(0.124)	0.024	0.006
270	22.50	0.07	0.030	(0.123)	0.024	0.006
271	22.58	0.07	0.030	(0.123)	0.024	0.006
272	22.67	0.07	0.030	(0.123)	0.024	0.006
273	22.75	0.07	0.030	(0.122)	0.024	0.006
274	22.83	0.07	0.030	(0.122)	0.024	0.006
275	22.92	0.07	0.030	(0.122)	0.024	0.006
276	23.00	0.07	0.030	(0.121)	0.024	0.006
277	23.08	0.07	0.030	(0.121)	0.024	0.006
278	23.17	0.07	0.030	(0.121)	0.024	0.006
279	23.25	0.07	0.030	(0.121)	0.024	0.006
280	23.33	0.07	0.030	(0.120)	0.024	0.006
281	23.42	0.07	0.030	(0.120)	0.024	0.006
282	23.50	0.07	0.030	(0.120)	0.024	0.006
283	23.58	0.07	0.030	(0.120)	0.024	0.006
284	23.67	0.07	0.030	(0.120)	0.024	0.006
285	23.75	0.07	0.030	(0.119)	0.024	0.006
286	23.83	0.07	0.030	(0.119)	0.024	0.006
287	23.92	0.07	0.030	(0.119)	0.024	0.006
288	24.00	0.07	0.030	(0.119)	0.024	0.006

(Loss Rate Not Used)

Sum = 100.0 Sum = 13.8

Flood volume = Effective rainfall 1.15(In)
times area 119.9(Ac.)/[(In)/(Ft.)] = 11.5(Ac.Ft)
Total soil loss = 2.54(In)
Total soil loss = 25.398(Ac.Ft)
Total rainfall = 3.69(In)
Flood volume = 501822.4 Cubic Feet
Total soil loss = 1106349.5 Cubic Feet

Peak flow rate of this hydrograph = 33.016(CFS)

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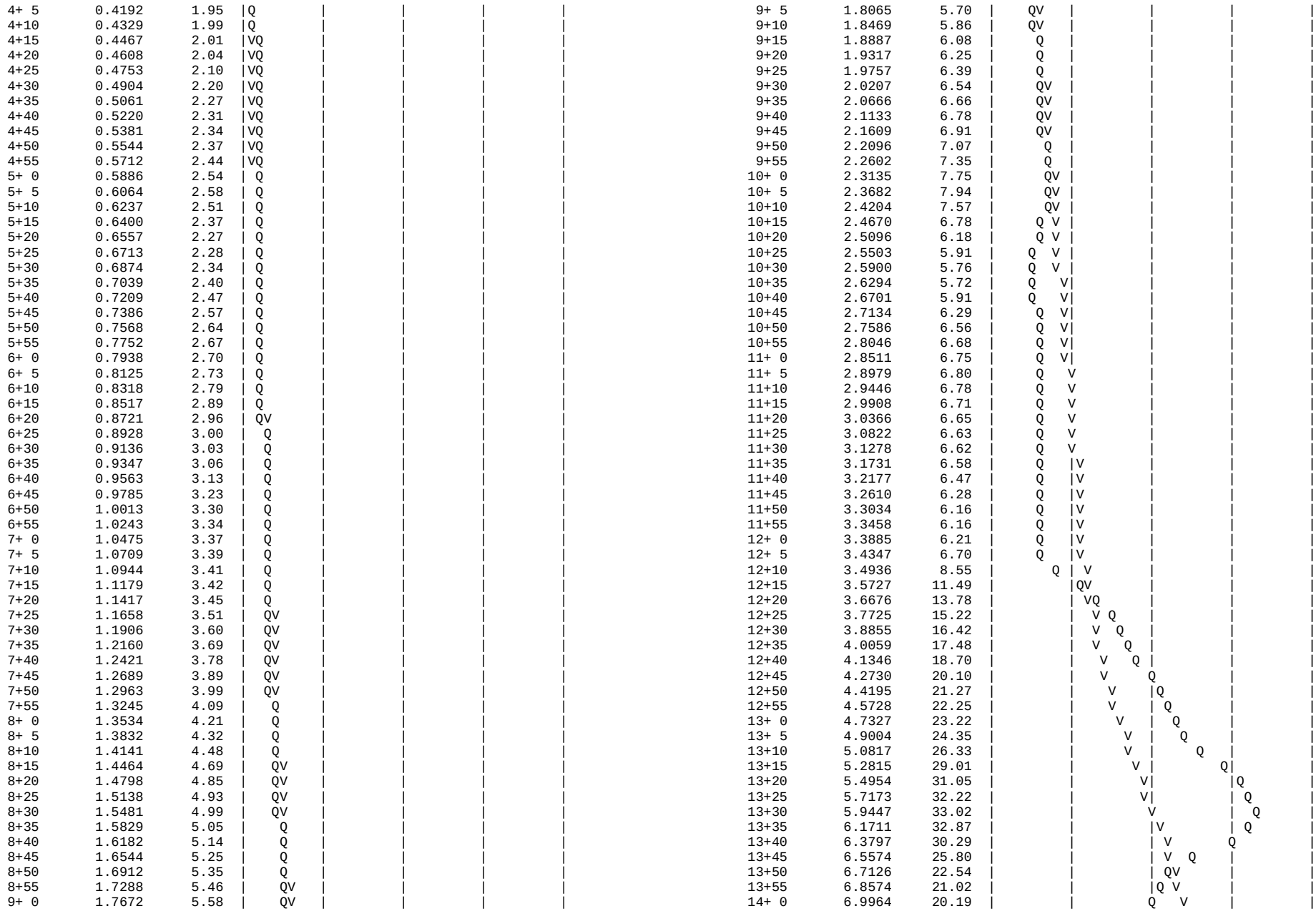
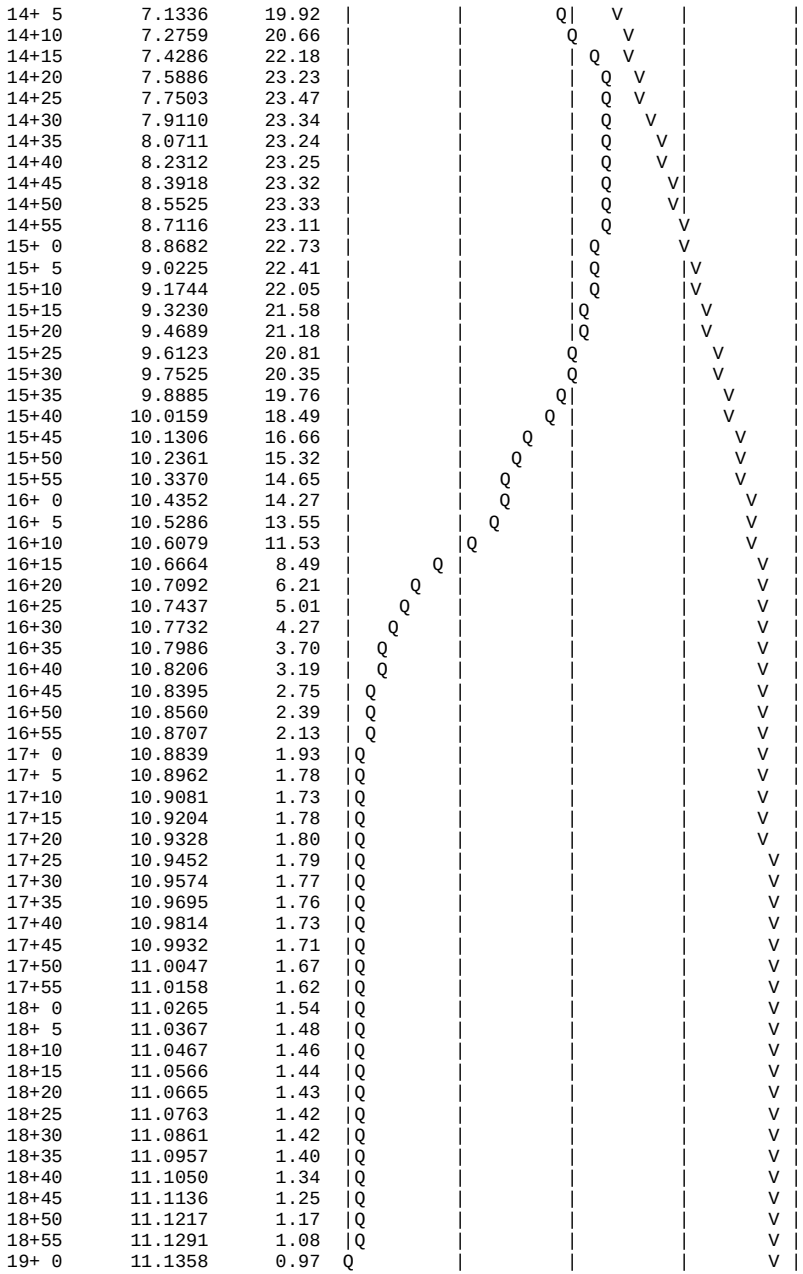
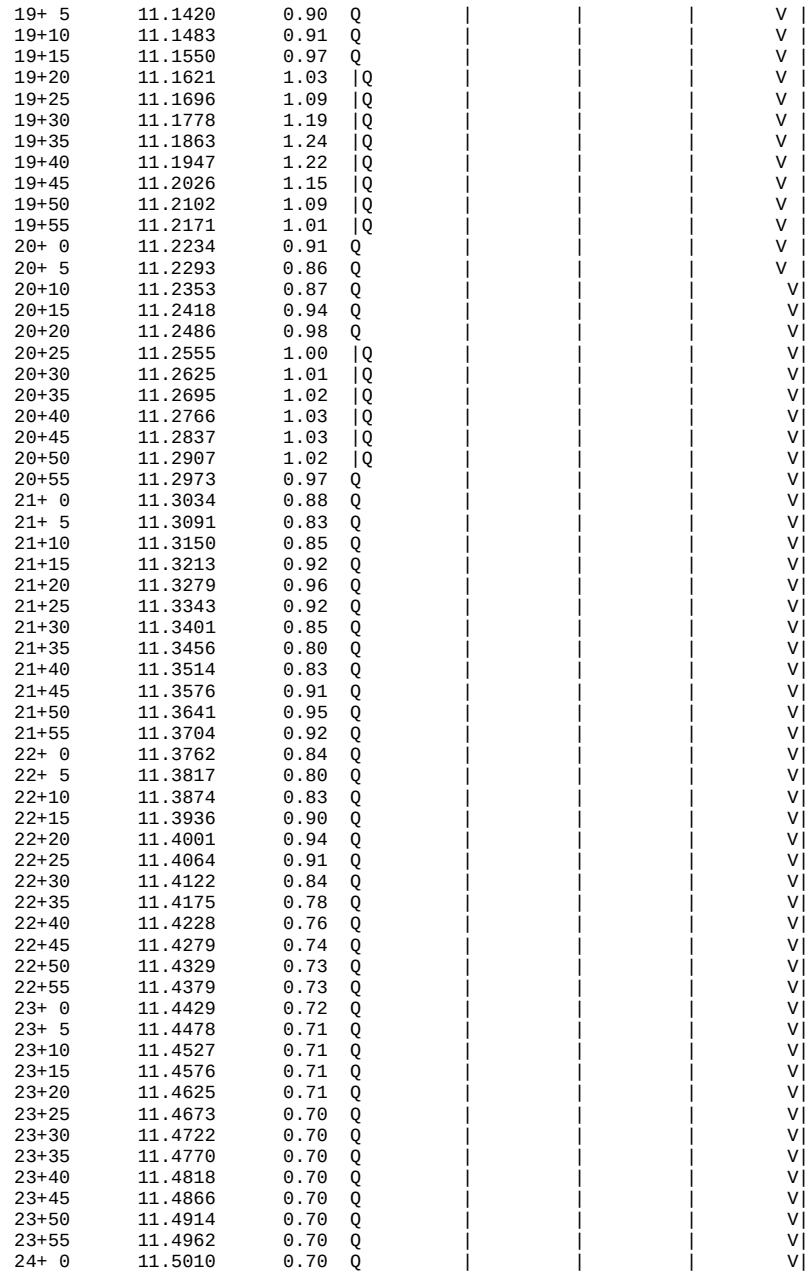
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0002	0.03	Q	|	|	|	|
0+10	0.0011	0.14	Q	|	|	|	|
0+15	0.0033	0.31	Q	|	|	|	|
0+20	0.0064	0.46	Q	|	|	|	|
0+25	0.0104	0.58	Q	|	|	|	|
0+30	0.0152	0.70	Q	|	|	|	|
0+35	0.0207	0.80	Q	|	|	|	|
0+40	0.0266	0.85	Q	|	|	|	|
0+45	0.0327	0.89	Q	|	|	|	|
0+50	0.0391	0.93	Q	|	|	|	|
0+55	0.0461	1.01	VQ	|	|	|	|
1+ 0	0.0538	1.11	VQ	|	|	|	|
1+ 5	0.0619	1.18	VQ	|	|	|	|
1+10	0.0700	1.17	VQ	|	|	|	|
1+15	0.0776	1.11	VQ	|	|	|	|
1+20	0.0850	1.07	VQ	|	|	|	|
1+25	0.0923	1.06	VQ	|	|	|	|
1+30	0.0996	1.06	VQ	|	|	|	|
1+35	0.1068	1.05	VQ	|	|	|	|
1+40	0.1141	1.05	VQ	|	|	|	|
1+45	0.1213	1.05	VQ	|	|	|	|
1+50	0.1287	1.07	VQ	|	|	|	|
1+55	0.1364	1.12	VQ	|	|	|	|
2+ 0	0.1447	1.21	VQ	|	|	|	|
2+ 5	0.1535	1.27	VQ	|	|	|	|
2+10	0.1625	1.30	VQ	|	|	|	|
2+15	0.1716	1.32	VQ	|	|	|	|
2+20	0.1808	1.33	VQ	|	|	|	|
2+25	0.1900	1.35	VQ	|	|	|	|
2+30	0.1993	1.35	VQ	|	|	|	|
2+35	0.2088	1.37	VQ	|	|	|	|
2+40	0.2187	1.43	VQ	|	|	|	|
2+45	0.2292	1.52	VQ	|	|	|	|
2+50	0.2402	1.59	VQ	|	|	|	|
2+55	0.2514	1.63	VQ	|	|	|	|
3+ 0	0.2628	1.65	VQ	|	|	|	|
3+ 5	0.2742	1.67	VQ	|	|	|	|
3+10	0.2858	1.68	VQ	|	|	|	|
3+15	0.2975	1.69	|Q	|	|	|	|
3+20	0.3092	1.70	|Q	|	|	|	|
3+25	0.3210	1.71	|Q	|	|	|	|
3+30	0.3328	1.71	|Q	|	|	|	|
3+35	0.3446	1.72	|Q	|	|	|	|
3+40	0.3565	1.72	|Q	|	|	|	|
3+45	0.3683	1.73	|Q	|	|	|	|
3+50	0.3803	1.74	|Q	|	|	|	|
3+55	0.3927	1.80	|Q	|	|	|	|
4+ 0	0.4057	1.89	|Q	|	|	|	|




14+ 5 7.1336 19.92
14+10 7.2759 20.66
14+15 7.4286 22.18
14+20 7.5886 23.23
14+25 7.7503 23.47
14+30 7.9110 23.34
14+35 8.0711 23.24
14+40 8.2312 23.25
14+45 8.3918 23.32
14+50 8.5525 23.33
14+55 8.7116 23.11
15+ 0 8.8682 22.73
15+ 5 9.0225 22.41
15+10 9.1744 22.05
15+15 9.3230 21.58
15+20 9.4689 21.18
15+25 9.6123 20.81
15+30 9.7525 20.35
15+35 9.8885 19.76
15+40 10.0159 18.49
15+45 10.1306 16.66
15+50 10.2361 15.32
15+55 10.3370 14.65
16+ 0 10.4352 14.27
16+ 5 10.5286 13.55
16+10 10.6079 11.53
16+15 10.6664 8.49
16+20 10.7092 6.21
16+25 10.7437 5.01
16+30 10.7732 4.27
16+35 10.7986 3.70
16+40 10.8206 3.19
16+45 10.8395 2.75
16+50 10.8560 2.39
16+55 10.8707 2.13
17+ 0 10.8839 1.93
17+ 5 10.8962 1.78
17+10 10.9081 1.73
17+15 10.9204 1.78
17+20 10.9328 1.80
17+25 10.9452 1.79
17+30 10.9574 1.77
17+35 10.9695 1.76
17+40 10.9814 1.73
17+45 10.9932 1.71
17+50 11.0047 1.67
17+55 11.0158 1.62
18+ 0 11.0265 1.54
18+ 5 11.0367 1.48
18+10 11.0467 1.46
18+15 11.0566 1.44
18+20 11.0665 1.43
18+25 11.0763 1.42
18+30 11.0861 1.42
18+35 11.0957 1.40
18+40 11.1050 1.34
18+45 11.1136 1.25
18+50 11.1217 1.17
18+55 11.1291 1.08
19+ 0 11.1358 0.97


19+ 5 11.1420 0.90
19+10 11.1483 0.91
19+15 11.1550 0.97
19+20 11.1621 1.03
19+25 11.1696 1.09
19+30 11.1778 1.19
19+35 11.1863 1.24
19+40 11.1947 1.22
19+45 11.2026 1.15
19+50 11.2102 1.09
19+55 11.2171 1.01
20+ 0 11.2234 0.91
20+ 5 11.2293 0.86
20+10 11.2353 0.87
20+15 11.2418 0.94
20+20 11.2486 0.98
20+25 11.2555 1.00
20+30 11.2625 1.01
20+35 11.2695 1.02
20+40 11.2766 1.03
20+45 11.2837 1.03
20+50 11.2907 1.02
20+55 11.2973 0.97
21+ 0 11.3034 0.88
21+ 5 11.3091 0.83
21+10 11.3150 0.85
21+15 11.3213 0.92
21+20 11.3279 0.96
21+25 11.3343 0.92
21+30 11.3401 0.85
21+35 11.3456 0.80
21+40 11.3514 0.83
21+45 11.3576 0.91
21+50 11.3641 0.95
21+55 11.3704 0.92
22+ 0 11.3762 0.84
22+ 5 11.3817 0.80
22+10 11.3874 0.83
22+15 11.3936 0.90
22+20 11.4001 0.94
22+25 11.4064 0.91
22+30 11.4122 0.84
22+35 11.4175 0.78
22+40 11.4228 0.76
22+45 11.4279 0.74
22+50 11.4329 0.73
22+55 11.4379 0.73
23+ 0 11.4429 0.72
23+ 5 11.4478 0.71
23+10 11.4527 0.71
23+15 11.4576 0.71
23+20 11.4625 0.71
23+25 11.4673 0.70
23+30 11.4722 0.70
23+35 11.4770 0.70
23+40 11.4818 0.70
23+45 11.4866 0.70
23+50 11.4914 0.70
23+55 11.4962 0.70
24+ 0 11.5010 0.70

24+ 5	11.5056	0.67	Q	|	|	|	V|
24+10	11.5094	0.56	Q	|	|	|	V|
24+15	11.5121	0.38	Q	|	|	|	V|
24+20	11.5138	0.25	Q	|	|	|	V|
24+25	11.5151	0.19	Q	|	|	|	V|
24+30	11.5161	0.15	Q	|	|	|	V|
24+35	11.5169	0.12	Q	|	|	|	V|
24+40	11.5176	0.10	Q	|	|	|	V|
24+45	11.5182	0.08	Q	|	|	|	V|
24+50	11.5186	0.06	Q	|	|	|	V|
24+55	11.5190	0.05	Q	|	|	|	V|
25+ 0	11.5193	0.04	Q	|	|	|	V|
25+ 5	11.5195	0.04	Q	|	|	|	V|
25+10	11.5197	0.03	Q	|	|	|	V|
25+15	11.5199	0.02	Q	|	|	|	V|
25+20	11.5200	0.02	Q	|	|	|	V|
25+25	11.5201	0.01	Q	|	|	|	V|
25+30	11.5202	0.01	Q	|	|	|	V|
25+35	11.5202	0.01	Q	|	|	|	V|
25+40	11.5202	0.00	Q	|	|	|	V|
25+45	11.5203	0.00	Q	|	|	|	V|

DRAINAGE AREA H

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
Study date 10/16/23 File: creh10uh2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6406

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

CRESCENT GARDENS
EXISTING CONDITION
AREA H
10/16/23

Drainage Area = 4.46(Ac.) = 0.007 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 4.46(Ac.) = 0.007 Sq. Mi.
Length along longest watercourse = 680.60(Ft.)
Length along longest watercourse measured to centroid = 342.00(Ft.)
Length along longest watercourse = 0.129 Mi.
Length along longest watercourse measured to centroid = 0.065 Mi.
Difference in elevation = 71.00(Ft.)
Slope along watercourse = 550.8081 Ft./Mi.
Average Manning's 'N' = 0.040
Lag time = 0.047 Hr.
Lag time = 2.82 Min.
25% of lag time = 0.70 Min.
40% of lag time = 1.13 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
4.46	2.21	9.86

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
4.46	5.82	25.96

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.210(In)
Area Averaged 100-Year Rainfall = 5.820(In)

Point rain (area averaged) = 3.695(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.695(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
4.460	89.00	0.000

Total Area Entered = 4.46(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
					Sum (F) =	0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	177.464	39.219	1.763
2	0.167	354.928	44.970	2.021
3	0.250	532.392	9.778	0.439
4	0.333	709.856	4.034	0.181
5	0.417	887.320	2.000	0.090
		Sum = 100.000	Sum=	4.495

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	(0.251)	0.027	0.003
2	0.17	0.07	0.030	(0.250)	0.027	0.003
3	0.25	0.07	0.030	(0.249)	0.027	0.003
4	0.33	0.10	0.044	(0.248)	0.040	0.004
5	0.42	0.10	0.044	(0.247)	0.040	0.004
6	0.50	0.10	0.044	(0.246)	0.040	0.004
7	0.58	0.10	0.044	(0.245)	0.040	0.004
8	0.67	0.10	0.044	(0.244)	0.040	0.004
9	0.75	0.10	0.044	(0.243)	0.040	0.004
10	0.83	0.13	0.059	(0.242)	0.053	0.006
11	0.92	0.13	0.059	(0.241)	0.053	0.006
12	1.00	0.13	0.059	(0.240)	0.053	0.006
13	1.08	0.10	0.044	(0.239)	0.040	0.004
14	1.17	0.10	0.044	(0.238)	0.040	0.004

15	1.25	0.10	0.044	(0.237)	0.040	0.004
16	1.33	0.10	0.044	(0.236)	0.040	0.004
17	1.42	0.10	0.044	(0.235)	0.040	0.004
18	1.50	0.10	0.044	(0.234)	0.040	0.004
19	1.58	0.10	0.044	(0.234)	0.040	0.004
20	1.67	0.10	0.044	(0.233)	0.040	0.004
21	1.75	0.10	0.044	(0.232)	0.040	0.004
22	1.83	0.13	0.059	(0.231)	0.053	0.006
23	1.92	0.13	0.059	(0.230)	0.053	0.006
24	2.00	0.13	0.059	(0.229)	0.053	0.006
25	2.08	0.13	0.059	(0.228)	0.053	0.006
26	2.17	0.13	0.059	(0.227)	0.053	0.006
27	2.25	0.13	0.059	(0.226)	0.053	0.006
28	2.33	0.13	0.059	(0.225)	0.053	0.006
29	2.42	0.13	0.059	(0.224)	0.053	0.006
30	2.50	0.13	0.059	(0.223)	0.053	0.006
31	2.58	0.17	0.074	(0.222)	0.067	0.007
32	2.67	0.17	0.074	(0.221)	0.067	0.007
33	2.75	0.17	0.074	(0.221)	0.067	0.007
34	2.83	0.17	0.074	(0.220)	0.067	0.007
35	2.92	0.17	0.074	(0.219)	0.067	0.007
36	3.00	0.17	0.074	(0.218)	0.067	0.007
37	3.08	0.17	0.074	(0.217)	0.067	0.007
38	3.17	0.17	0.074	(0.216)	0.067	0.007
39	3.25	0.17	0.074	(0.215)	0.067	0.007
40	3.33	0.17	0.074	(0.214)	0.067	0.007
41	3.42	0.17	0.074	(0.213)	0.067	0.007
42	3.50	0.17	0.074	(0.212)	0.067	0.007
43	3.58	0.17	0.074	(0.212)	0.067	0.007
44	3.67	0.17	0.074	(0.211)	0.067	0.007
45	3.75	0.17	0.074	(0.210)	0.067	0.007
46	3.83	0.20	0.089	(0.209)	0.080	0.009
47	3.92	0.20	0.089	(0.208)	0.080	0.009
48	4.00	0.20	0.089	(0.207)	0.080	0.009
49	4.08	0.20	0.089	(0.206)	0.080	0.009
50	4.17	0.20	0.089	(0.205)	0.080	0.009
51	4.25	0.20	0.089	(0.205)	0.080	0.009
52	4.33	0.23	0.103	(0.204)	0.093	0.010
53	4.42	0.23	0.103	(0.203)	0.093	0.010
54	4.50	0.23	0.103	(0.202)	0.093	0.010
55	4.58	0.23	0.103	(0.201)	0.093	0.010
56	4.67	0.23	0.103	(0.200)	0.093	0.010
57	4.75	0.23	0.103	(0.199)	0.093	0.010
58	4.83	0.27	0.118	(0.198)	0.106	0.012
59	4.92	0.27	0.118	(0.198)	0.106	0.012
60	5.00	0.27	0.118	(0.197)	0.106	0.012
61	5.08	0.20	0.089	(0.196)	0.080	0.009
62	5.17	0.20	0.089	(0.195)	0.080	0.009
63	5.25	0.20	0.089	(0.194)	0.080	0.009
64	5.33	0.23	0.103	(0.193)	0.093	0.010
65	5.42	0.23	0.103	(0.193)	0.093	0.010
66	5.50	0.23	0.103	(0.192)	0.093	0.010
67	5.58	0.27	0.118	(0.191)	0.106	0.012
68	5.67	0.27	0.118	(0.190)	0.106	0.012
69	5.75	0.27	0.118	(0.189)	0.106	0.012
70	5.83	0.27	0.118	(0.188)	0.106	0.012
71	5.92	0.27	0.118	(0.187)	0.106	0.012
72	6.00	0.27	0.118	(0.187)	0.106	0.012
73	6.08	0.30	0.133	(0.186)	0.120	0.013
74	6.17	0.30	0.133	(0.185)	0.120	0.013
75	6.25	0.30	0.133	(0.184)	0.120	0.013
76	6.33	0.30	0.133	(0.183)	0.120	0.013
77	6.42	0.30	0.133	(0.183)	0.120	0.013
78	6.50	0.30	0.133	(0.182)	0.120	0.013
79	6.58	0.33	0.148	(0.181)	0.133	0.015
80	6.67	0.33	0.148	(0.180)	0.133	0.015
81	6.75	0.33	0.148	(0.179)	0.133	0.015
82	6.83	0.33	0.148	(0.178)	0.133	0.015
83	6.92	0.33	0.148	(0.178)	0.133	0.015
84	7.00	0.33	0.148	(0.177)	0.133	0.015
85	7.08	0.33	0.148	(0.176)	0.133	0.015
86	7.17	0.33	0.148	(0.175)	0.133	0.015
87	7.25	0.33	0.148	(0.174)	0.133	0.015
88	7.33	0.37	0.163	(0.174)	0.146	0.016
89	7.42	0.37	0.163	(0.173)	0.146	0.016
90	7.50	0.37	0.163	(0.172)	0.146	0.016
91	7.58	0.40	0.177	(0.171)	0.160	0.018
92	7.67	0.40	0.177	(0.170)	0.160	0.018
93	7.75	0.40	0.177	(0.170)	0.160	0.018
94	7.83	0.43	0.192	0.169	(0.173)	0.023
95	7.92	0.43	0.192	0.168	(0.173)	0.024
96	8.00	0.43	0.192	0.167	(0.173)	0.025
97	8.08	0.50	0.222	0.167	(0.200)	0.055
98	8.17	0.50	0.222	0.166	(0.200)	0.056
99	8.25	0.50	0.222	0.165	(0.200)	0.057
100	8.33	0.50	0.222	0.164	(0.200)	0.057
101	8.42	0.50	0.222	0.163	(0.200)	0.058
102	8.50	0.50	0.222	0.163	(0.200)	0.059
103	8.58	0.53	0.236	0.162	(0.213)	0.075
104	8.67	0.53	0.236	0.161	(0.213)	0.075
105	8.75	0.53	0.236	0.160	(0.213)	0.076
106	8.83	0.57	0.251	0.160	(0.226)	0.092
107	8.92	0.57	0.251	0.159	(0.226)	0.092
108	9.00	0.57	0.251	0.158	(0.226)	0.093
109	9.08	0.63	0.281	0.157	(0.253)	0.123
110	9.17	0.63	0.281	0.157	(0.253)	0.124
111	9.25	0.63	0.281	0.156	(0.253)	0.125
112	9.33	0.67	0.296	0.155	(0.266)	0.140
113	9.42	0.67	0.296	0.154	(0.266)	0.141
114	9.50	0.67	0.296	0.154	(0.266)	0.142
115	9.58	0.70	0.310	0.153	(0.279)	0.157
116	9.67	0.70	0.310	0.152	(0.279)	0.158
117	9.75	0.70	0.310	0.151	(0.279)	0.159
118	9.83	0.73	0.325	0.151	(0.293)	0.174
119	9.92	0.73	0.325	0.150	(0.293)	0.175
120	10.00	0.73	0.325	0.149	(0.293)	0.176
121	10.08	0.50	0.222	0.149	(0.200)	0.073
122	10.17	0.50	0.222	0.148	(0.200)	0.074
123	10.25	0.50	0.222	0.147	(0.200)	0.075
124	10.33	0.50	0.222	0.146	(0.200)	0.075
125	10.42	0.50	0.222	0.146	(0.200)	0.076
126	10.50	0.50	0.222	0.145	(0.200)	0.077
127	10.58	0.67	0.296	0.144	(0.266)	0.151
128	10.67	0.67	0.296	0.144	(0.266)	0.152
129	10.75	0.67	0.296	0.143	(0.266)	0.153
130	10.83	0.67	0.296	0.142	(0.266)	0.153
131	10.92	0.67	0.296	0.142	(0.266)	0.154
132	11.00	0.67	0.296	0.141	(0.266)	0.155
133	11.08	0.63	0.281	0.140	(0.253)	0.141
134	11.17	0.63	0.281	0.139	(0.253)	0.141

135	11.25	0.63	0.281	0.139	(0.253)	0.142
136	11.33	0.63	0.281	0.138	(0.253)	0.143
137	11.42	0.63	0.281	0.137	(0.253)	0.143
138	11.50	0.63	0.281	0.137	(0.253)	0.144
139	11.58	0.57	0.251	0.136	(0.226)	0.115
140	11.67	0.57	0.251	0.135	(0.226)	0.116
141	11.75	0.57	0.251	0.135	(0.226)	0.117
142	11.83	0.60	0.266	0.134	(0.239)	0.132
143	11.92	0.60	0.266	0.133	(0.239)	0.133
144	12.00	0.60	0.266	0.133	(0.239)	0.133
145	12.08	0.83	0.370	0.132	(0.333)	0.238
146	12.17	0.83	0.370	0.131	(0.333)	0.238
147	12.25	0.83	0.370	0.131	(0.333)	0.239
148	12.33	0.87	0.384	0.130	(0.346)	0.254
149	12.42	0.87	0.384	0.129	(0.346)	0.255
150	12.50	0.87	0.384	0.129	(0.346)	0.256
151	12.58	0.93	0.414	0.128	(0.372)	0.286
152	12.67	0.93	0.414	0.127	(0.372)	0.286
153	12.75	0.93	0.414	0.127	(0.372)	0.287
154	12.83	0.97	0.429	0.126	(0.386)	0.302
155	12.92	0.97	0.429	0.126	(0.386)	0.303
156	13.00	0.97	0.429	0.125	(0.386)	0.304
157	13.08	1.13	0.503	0.124	(0.452)	0.378
158	13.17	1.13	0.503	0.124	(0.452)	0.379
159	13.25	1.13	0.503	0.123	(0.452)	0.380
160	13.33	1.13	0.503	0.122	(0.452)	0.380
161	13.42	1.13	0.503	0.122	(0.452)	0.381
162	13.50	1.13	0.503	0.121	(0.452)	0.381
163	13.58	0.77	0.340	0.120	(0.306)	0.219
164	13.67	0.77	0.340	0.120	(0.306)	0.220
165	13.75	0.77	0.340	0.119	(0.306)	0.221
166	13.83	0.77	0.340	0.119	(0.306)	0.221
167	13.92	0.77	0.340	0.118	(0.306)	0.222
168	14.00	0.77	0.340	0.117	(0.306)	0.222
169	14.08	0.90	0.399	0.117	(0.359)	0.282
170	14.17	0.90	0.399	0.116	(0.359)	0.283
171	14.25	0.90	0.399	0.116	(0.359)	0.283
172	14.33	0.87	0.384	0.115	(0.346)	0.269
173	14.42	0.87	0.384	0.114	(0.346)	0.270
174	14.50	0.87	0.384	0.114	(0.346)	0.270
175	14.58	0.87	0.384	0.113	(0.346)	0.271
176	14.67	0.87	0.384	0.113	(0.346)	0.272
177	14.75	0.87	0.384	0.112	(0.346)	0.272
178	14.83	0.83	0.370	0.112	(0.333)	0.258
179	14.92	0.83	0.370	0.111	(0.333)	0.259
180	15.00	0.83	0.370	0.110	(0.333)	0.259
181	15.08	0.80	0.355	0.110	(0.319)	0.245
182	15.17	0.80	0.355	0.109	(0.319)	0.245
183	15.25	0.80	0.355	0.109	(0.319)	0.246
184	15.33	0.77	0.340	0.108	(0.306)	0.232
185	15.42	0.77	0.340	0.108	(0.306)	0.232
186	15.50	0.77	0.340	0.107	(0.306)	0.233
187	15.58	0.63	0.281	0.107	(0.253)	0.174
188	15.67	0.63	0.281	0.106	(0.253)	0.175
189	15.75	0.63	0.281	0.105	(0.253)	0.175
190	15.83	0.63	0.281	0.105	(0.253)	0.176
191	15.92	0.63	0.281	0.104	(0.253)	0.176
192	16.00	0.63	0.281	0.104	(0.253)	0.177
193	16.08	0.13	0.059	(0.103)	0.053	0.006
194	16.17	0.13	0.059	(0.103)	0.053	0.006
195	16.25	0.13	0.059	(0.102)	0.053	0.006
196	16.33	0.13	0.059	(0.102)	0.053	0.006
197	16.42	0.13	0.059	(0.101)	0.053	0.006
198	16.50	0.13	0.059	(0.101)	0.053	0.006
199	16.58	0.10	0.044	(0.100)	0.040	0.004
200	16.67	0.10	0.044	(0.100)	0.040	0.004
201	16.75	0.10	0.044	(0.099)	0.040	0.004
202	16.83	0.10	0.044	(0.099)	0.040	0.004
203	16.92	0.10	0.044	(0.098)	0.040	0.004
204	17.00	0.10	0.044	(0.098)	0.040	0.004
205	17.08	0.17	0.074	(0.097)	0.067	0.007
206	17.17	0.17	0.074	(0.097)	0.067	0.007
207	17.25	0.17	0.074	(0.096)	0.067	0.007
208	17.33	0.17	0.074	(0.096)	0.067	0.007
209	17.42	0.17	0.074	(0.095)	0.067	0.007
210	17.50	0.17	0.074	(0.095)	0.067	0.007
211	17.58	0.17	0.074	(0.094)	0.067	0.007
212	17.67	0.17	0.074	(0.094)	0.067	0.007
213	17.75	0.17	0.074	(0.093)	0.067	0.007
214	17.83	0.13	0.059	(0.093)	0.053	0.006
215	17.92	0.13	0.059	(0.092)	0.053	0.006
216	18.00	0.13	0.059	(0.092)	0.053	0.006
217	18.08	0.13	0.059	(0.092)	0.053	0.006
218	18.17	0.13	0.059	(0.091)	0.053	0.006
219	18.25	0.13	0.059	(0.091)	0.053	0.006
220	18.33	0.13	0.059	(0.090)	0.053	0.006
221	18.42	0.13	0.059	(0.090)	0.053	0.006
222	18.50	0.13	0.059	(0.089)	0.053	0.006
223	18.58	0.10	0.044	(0.089)	0.040	0.004
224	18.67	0.10	0.044	(0.088)	0.040	0.004
225	18.75	0.10	0.044	(0.088)	0.040	0.004
226	18.83	0.07	0.030	(0.088)	0.027	0.003
227	18.92	0.07	0.030	(0.087)	0.027	0.003
228	19.00	0.07	0.030	(0.087)	0.027	0.003
229	19.08	0.10	0.044	(0.086)	0.040	0.004
230	19.17	0.10	0.044	(0.086)	0.040	0.004
231	19.25	0.10	0.044	(0.086)	0.040	0.004
232	19.33	0.13	0.059	(0.085)	0.053	0.006
233	19.42	0.13	0.059	(0.085)	0.053	0.006
234	19.50	0.13	0.059	(0.084)	0.053	0.006
235	19.58	0.10	0.044	(0.084)	0.040	0.004
236	19.67	0.10	0.044	(0.084)	0.040	0.004
237	19.75	0.10	0.044	(0.083)	0.040	0.004
238	19.83	0.07	0.030	(0.083)	0.027	0.003
239	19.92	0.07	0.030	(0.082)	0.027	0.003
240	20.00	0.07	0.030	(0.082)	0.027	0.003
241	20.08	0.10	0.044	(0.082)	0.040	0.004
242	20.17	0.10	0.044	(0.081)	0.040	0.004
243	20.25	0.10	0.044	(0.081)	0.040	0.004
244	20.33	0.10	0.044	(0.081)	0.040	0.004
245	20.42	0.10	0.044	(0.080)	0.040	0.004
246	20.50	0.10	0.044	(0.080)	0.040	0.004
247	20.58	0.10	0.044	(0.080)	0.040	0.004
248	20.67	0.10	0.044	(0.079)	0.040	0.004
249	20.75	0.10	0.044	(0.079)	0.040	0.004
250	20.83	0.07	0.030	(0.079)	0.027	0.003
251	20.92	0.07	0.030	(0.078)	0.027	0.003
252	21.00	0.07	0.030	(0.078)	0.027	0.003
253	21.08	0.10	0.044	(0.078)	0.040	0.004
254	21.17	0.10	0.044	(0.077)	0.040	0.004

255	21.25	0.10	0.044	(0.077)	0.040	0.004
256	21.33	0.07	0.030	(0.077)	0.027	0.003
257	21.42	0.07	0.030	(0.077)	0.027	0.003
258	21.50	0.07	0.030	(0.076)	0.027	0.003
259	21.58	0.10	0.044	(0.076)	0.040	0.004
260	21.67	0.10	0.044	(0.076)	0.040	0.004
261	21.75	0.10	0.044	(0.075)	0.040	0.004
262	21.83	0.07	0.030	(0.075)	0.027	0.003
263	21.92	0.07	0.030	(0.075)	0.027	0.003
264	22.00	0.07	0.030	(0.075)	0.027	0.003
265	22.08	0.10	0.044	(0.074)	0.040	0.004
266	22.17	0.10	0.044	(0.074)	0.040	0.004
267	22.25	0.10	0.044	(0.074)	0.040	0.004
268	22.33	0.07	0.030	(0.074)	0.027	0.003
269	22.42	0.07	0.030	(0.073)	0.027	0.003
270	22.50	0.07	0.030	(0.073)	0.027	0.003
271	22.58	0.07	0.030	(0.073)	0.027	0.003
272	22.67	0.07	0.030	(0.073)	0.027	0.003
273	22.75	0.07	0.030	(0.073)	0.027	0.003
274	22.83	0.07	0.030	(0.072)	0.027	0.003
275	22.92	0.07	0.030	(0.072)	0.027	0.003
276	23.00	0.07	0.030	(0.072)	0.027	0.003
277	23.08	0.07	0.030	(0.072)	0.027	0.003
278	23.17	0.07	0.030	(0.072)	0.027	0.003
279	23.25	0.07	0.030	(0.072)	0.027	0.003
280	23.33	0.07	0.030	(0.071)	0.027	0.003
281	23.42	0.07	0.030	(0.071)	0.027	0.003
282	23.50	0.07	0.030	(0.071)	0.027	0.003
283	23.58	0.07	0.030	(0.071)	0.027	0.003
284	23.67	0.07	0.030	(0.071)	0.027	0.003
285	23.75	0.07	0.030	(0.071)	0.027	0.003
286	23.83	0.07	0.030	(0.071)	0.027	0.003
287	23.92	0.07	0.030	(0.071)	0.027	0.003
288	24.00	0.07	0.030	(0.071)	0.027	0.003

(Loss Rate Not Used)

Sum = 100.0 Sum = 19.5

Flood volume = Effective rainfall 1.63(In)
times area 4.5(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 2.07(In)
Total soil loss = 0.768(Ac.Ft)
Total rainfall = 3.70(In)
Flood volume = 26372.0 Cubic Feet
Total soil loss = 33451.8 Cubic Feet

Peak flow rate of this hydrograph = 1.713(CFS)

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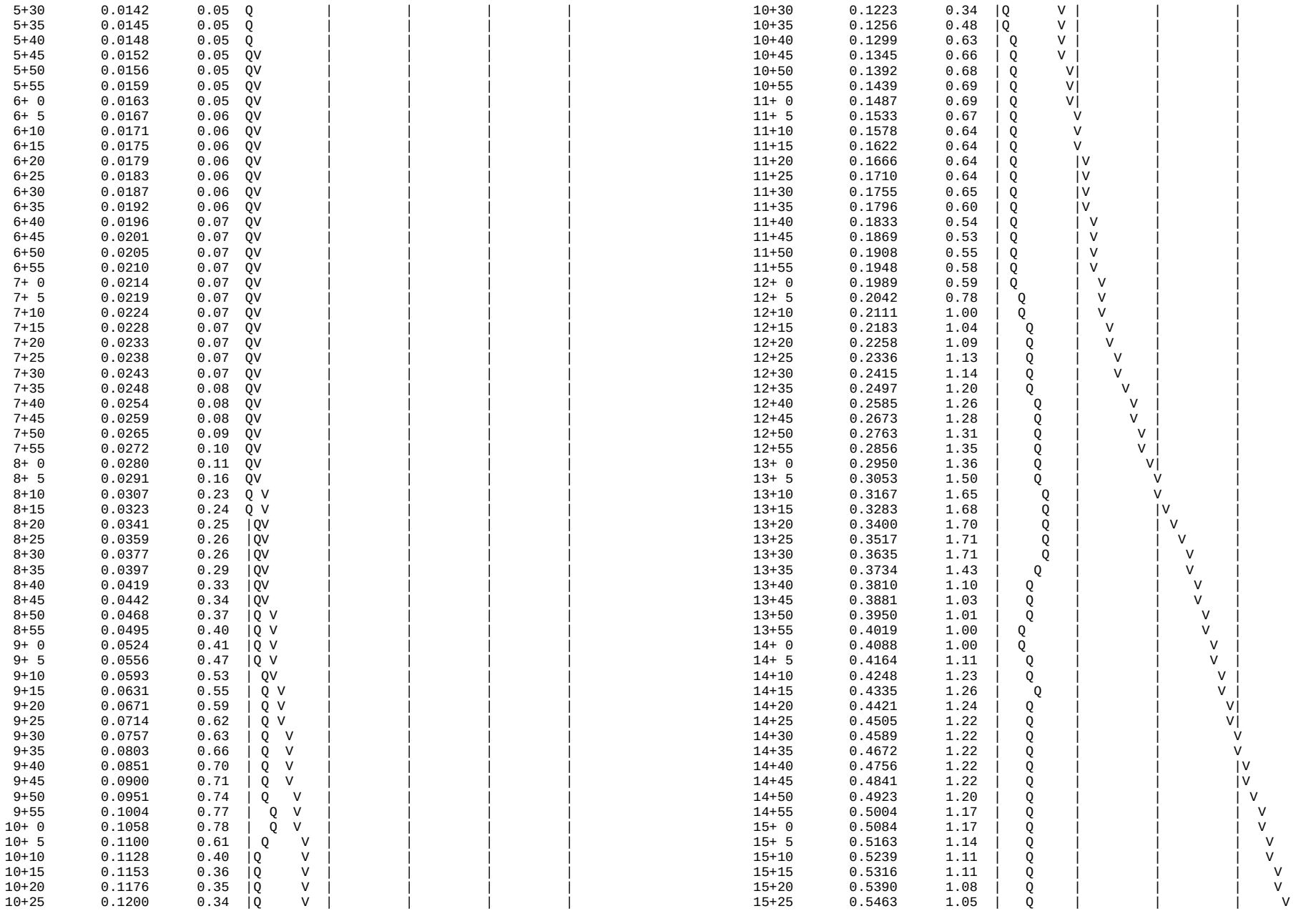
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0002	0.01	Q	|	|	|	|
0+20	0.0003	0.02	Q	|	|	|	|
0+25	0.0004	0.02	Q	|	|	|	|
0+30	0.0006	0.02	Q	|	|	|	|
0+35	0.0007	0.02	Q	|	|	|	|
0+40	0.0008	0.02	Q	|	|	|	|
0+45	0.0010	0.02	Q	|	|	|	|
0+50	0.0011	0.02	Q	|	|	|	|
0+55	0.0013	0.03	Q	|	|	|	|
1+ 0	0.0015	0.03	Q	|	|	|	|
1+ 5	0.0017	0.02	Q	|	|	|	|
1+10	0.0018	0.02	Q	|	|	|	|
1+15	0.0019	0.02	Q	|	|	|	|
1+20	0.0021	0.02	Q	|	|	|	|
1+25	0.0022	0.02	Q	|	|	|	|
1+30	0.0024	0.02	Q	|	|	|	|
1+35	0.0025	0.02	Q	|	|	|	|
1+40	0.0026	0.02	Q	|	|	|	|
1+45	0.0028	0.02	Q	|	|	|	|
1+50	0.0029	0.02	Q	|	|	|	|
1+55	0.0031	0.03	Q	|	|	|	|
2+ 0	0.0033	0.03	Q	|	|	|	|
2+ 5	0.0035	0.03	Q	|	|	|	|
2+10	0.0036	0.03	Q	|	|	|	|
2+15	0.0038	0.03	Q	|	|	|	|
2+20	0.0040	0.03	Q	|	|	|	|
2+25	0.0042	0.03	Q	|	|	|	|
2+30	0.0044	0.03	Q	|	|	|	|
2+35	0.0046	0.03	Q	|	|	|	|
2+40	0.0048	0.03	Q	|	|	|	|
2+45	0.0050	0.03	Q	|	|	|	|
2+50	0.0053	0.03	Q	|	|	|	|
2+55	0.0055	0.03	Q	|	|	|	|
3+ 0	0.0057	0.03	Q	|	|	|	|
3+ 5	0.0059	0.03	Q	|	|	|	|
3+10	0.0062	0.03	Q	|	|	|	|
3+15	0.0064	0.03	Q	|	|	|	|
3+20	0.0066	0.03	Q	|	|	|	|
3+25	0.0069	0.03	Q	|	|	|	|
3+30	0.0071	0.03	Q	|	|	|	|
3+35	0.0073	0.03	Q	|	|	|	|
3+40	0.0075	0.03	Q	|	|	|	|
3+45	0.0078	0.03	Q	|	|	|	|
3+50	0.0080	0.04	Q	|	|	|	|
3+55	0.0083	0.04	Q	|	|	|	|
4+ 0	0.0086	0.04	Q	|	|	|	|
4+ 5	0.0088	0.04	Q	|	|	|	|
4+10	0.0091	0.04	Q	|	|	|	|
4+15	0.0094	0.04	Q	|	|	|	|
4+20	0.0097	0.04	Q	|	|	|	|
4+25	0.0100	0.05	Q	|	|	|	|
4+30	0.0103	0.05	Q	|	|	|	|
4+35	0.0106	0.05	Q	|	|	|	|
4+40	0.0109	0.05	Q	|	|	|	|
4+45	0.0113	0.05	Q	|	|	|	|
4+50	0.0116	0.05	Q	|	|	|	|
4+55	0.0120	0.05	Q	|	|	|	|
5+ 0	0.0123	0.05	Q	|	|	|	|
5+ 5	0.0127	0.05	Q	|	|	|	|
5+10	0.0129	0.04	Q	|	|	|	|
5+15	0.0132	0.04	Q	|	|	|	|
5+20	0.0135	0.04	Q	|	|	|	|
5+25	0.0138	0.05	Q	|	|	|	|



15+30	0.5535	1.05	| Q	|	|	| V	|
15+35	0.5600	0.94	| Q	|	|	| V	|
15+40	0.5657	0.83	| Q	|	|	| V	|
15+45	0.5712	0.80	| Q	|	|	| V	|
15+50	0.5767	0.79	| Q	|	|	| V	|
15+55	0.5821	0.79	| Q	|	|	| V	|
16+ 0	0.5876	0.79	| Q	|	|	| V	|
16+ 5	0.5910	0.49	|Q	|	|	| V	|
16+10	0.5920	0.15	Q	|	|	| V	|
16+15	0.5925	0.07	Q	|	|	| V	|
16+20	0.5928	0.04	Q	|	|	| V	|
16+25	0.5930	0.03	Q	|	|	| V	|
16+30	0.5932	0.03	Q	|	|	| V	|
16+35	0.5933	0.02	Q	|	|	| V	|
16+40	0.5935	0.02	Q	|	|	| V	|
16+45	0.5936	0.02	Q	|	|	| V	|
16+50	0.5938	0.02	Q	|	|	| V	|
16+55	0.5939	0.02	Q	|	|	| V	|
17+ 0	0.5940	0.02	Q	|	|	| V	|
17+ 5	0.5942	0.03	Q	|	|	| V	|
17+10	0.5944	0.03	Q	|	|	| V	|
17+15	0.5947	0.03	Q	|	|	| V	|
17+20	0.5949	0.03	Q	|	|	| V	|
17+25	0.5951	0.03	Q	|	|	| V	|
17+30	0.5953	0.03	Q	|	|	| V	|
17+35	0.5956	0.03	Q	|	|	| V	|
17+40	0.5958	0.03	Q	|	|	| V	|
17+45	0.5960	0.03	Q	|	|	| V	|
17+50	0.5962	0.03	Q	|	|	| V	|
17+55	0.5964	0.03	Q	|	|	| V	|
18+ 0	0.5966	0.03	Q	|	|	| V	|
18+ 5	0.5968	0.03	Q	|	|	| V	|
18+10	0.5970	0.03	Q	|	|	| V	|
18+15	0.5972	0.03	Q	|	|	| V	|
18+20	0.5973	0.03	Q	|	|	| V	|
18+25	0.5975	0.03	Q	|	|	| V	|
18+30	0.5977	0.03	Q	|	|	| V	|
18+35	0.5979	0.02	Q	|	|	| V	|
18+40	0.5980	0.02	Q	|	|	| V	|
18+45	0.5982	0.02	Q	|	|	| V	|
18+50	0.5983	0.02	Q	|	|	| V	|
18+55	0.5984	0.01	Q	|	|	| V	|
19+ 0	0.5985	0.01	Q	|	|	| V	|
19+ 5	0.5986	0.02	Q	|	|	| V	|
19+10	0.5987	0.02	Q	|	|	| V	|
19+15	0.5988	0.02	Q	|	|	| V	|
19+20	0.5990	0.02	Q	|	|	| V	|
19+25	0.5992	0.03	Q	|	|	| V	|
19+30	0.5994	0.03	Q	|	|	| V	|
19+35	0.5995	0.02	Q	|	|	| V	|
19+40	0.5997	0.02	Q	|	|	| V	|
19+45	0.5998	0.02	Q	|	|	| V	|
19+50	0.5999	0.02	Q	|	|	| V	|
19+55	0.6000	0.01	Q	|	|	| V	|
20+ 0	0.6001	0.01	Q	|	|	| V	|
20+ 5	0.6002	0.02	Q	|	|	| V	|
20+10	0.6004	0.02	Q	|	|	| V	|
20+15	0.6005	0.02	Q	|	|	| V	|
20+20	0.6006	0.02	Q	|	|	| V	|
20+25	0.6008	0.02	Q	|	|	| V	|
20+30	0.6009	0.02	Q	|	|	| V	|
20+35	0.6010	0.02	Q	|	|	| V	|
20+40	0.6012	0.02	Q	|	|	| V	|
20+45	0.6013	0.02	Q	|	|	| V	|
20+50	0.6014	0.02	Q	|	|	| V	|
20+55	0.6015	0.01	Q	|	|	| V	|
21+ 0	0.6016	0.01	Q	|	|	| V	|
21+ 5	0.6017	0.02	Q	|	|	| V	|
21+10	0.6019	0.02	Q	|	|	| V	|
21+15	0.6020	0.02	Q	|	|	| V	|
21+20	0.6021	0.02	Q	|	|	| V	|
21+25	0.6022	0.01	Q	|	|	| V	|
21+30	0.6023	0.01	Q	|	|	| V	|
21+35	0.6024	0.02	Q	|	|	| V	|
21+40	0.6026	0.02	Q	|	|	| V	|
21+45	0.6027	0.02	Q	|	|	| V	|
21+50	0.6028	0.02	Q	|	|	| V	|
21+55	0.6029	0.01	Q	|	|	| V	|
22+ 0	0.6030	0.01	Q	|	|	| V	|
22+ 5	0.6031	0.02	Q	|	|	| V	|
22+10	0.6032	0.02	Q	|	|	| V	|
22+15	0.6034	0.02	Q	|	|	| V	|
22+20	0.6035	0.02	Q	|	|	| V	|
22+25	0.6036	0.01	Q	|	|	| V	|
22+30	0.6037	0.01	Q	|	|	| V	|
22+35	0.6038	0.01	Q	|	|	| V	|
22+40	0.6039	0.01	Q	|	|	| V	|
22+45	0.6040	0.01	Q	|	|	| V	|
22+50	0.6041	0.01	Q	|	|	| V	|
22+55	0.6042	0.01	Q	|	|	| V	|
23+ 0	0.6042	0.01	Q	|	|	| V	|
23+ 5	0.6043	0.01	Q	|	|	| V	|
23+10	0.6044	0.01	Q	|	|	| V	|
23+15	0.6045	0.01	Q	|	|	| V	|
23+20	0.6046	0.01	Q	|	|	| V	|
23+25	0.6047	0.01	Q	|	|	| V	|
23+30	0.6048	0.01	Q	|	|	| V	|
23+35	0.6049	0.01	Q	|	|	| V	|
23+40	0.6050	0.01	Q	|	|	| V	|
23+45	0.6051	0.01	Q	|	|	| V	|
23+50	0.6052	0.01	Q	|	|	| V	|
23+55	0.6052	0.01	Q	|	|	| V	|
24+ 0	0.6053	0.01	Q	|	|	| V	|
24+ 5	0.6054	0.01	Q	|	|	| V	|
24+10	0.6054	0.00	Q	|	|	| V	|
24+15	0.6054	0.00	Q	|	|	| V	|
24+20	0.6054	0.00	Q	|	|	| V	V

UNIT HYDROGRAPH RESULTS PROPOSED CONDITION (10-YEAR, 24HR STORM)

DRAINAGE AREA A

U n i t H y d r o g r a p h A n a l y s i s

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Study date 10/16/23 File: crpa10uh2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6406

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

CRESCENT GARDENS
Proposed Condition
Area A
10/16/23

Drainage Area = 120.22(Ac.) = 0.188 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 120.22(Ac.) = 0.188 Sq. Mi.
Length along longest watercourse = 5504.00(Ft.)
Length along longest watercourse measured to centroid = 2594.00(Ft.)
Length along longest watercourse = 1.042 Mi.
Length along longest watercourse measured to centroid = 0.491 Mi.
Difference in elevation = 131.80(Ft.)
Slope along watercourse = 126.4360 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.223 Hr.
Lag time = 13.36 Min.
25% of lag time = 3.34 Min.
40% of lag time = 5.34 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
120.22	2.21	265.69

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
120.22	5.82	699.68

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.210(In)
Area Averaged 100-Year Rainfall = 5.820(In)

Point rain (area averaged) = 3.695(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 3.694(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
120.220	77.40	0.155

Total Area Entered = 120.22(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
77.4	77.4	0.275	0.155	0.236	1.000	0.236
					Sum (F) =	0.236

Area averaged mean soil loss (F) (In/Hr) = 0.236
Minimum soil loss rate ((In/Hr)) = 0.118
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.776

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	37.435	3.948	4.784
2	0.167	74.870	15.900	19.265
3	0.250	112.305	25.143	30.463
4	0.333	149.740	18.667	22.617
5	0.417	187.175	9.371	11.354
6	0.500	224.610	5.615	6.804
7	0.583	262.045	4.164	5.045
8	0.667	299.480	3.270	3.961
9	0.750	336.914	2.513	3.044
10	0.833	374.349	2.119	2.568
11	0.917	411.784	1.661	2.013
12	1.000	449.219	1.303	1.579
13	1.083	486.654	1.162	1.408
14	1.167	524.089	1.061	1.286
15	1.250	561.524	0.836	1.012
16	1.333	598.959	0.710	0.860
17	1.417	636.394	0.603	0.731
18	1.500	673.829	0.494	0.598
19	1.583	711.264	0.384	0.466
20	1.667	748.699	0.374	0.454
21	1.750	786.134	0.374	0.454
22	1.833	823.569	0.326	0.395
			Sum = 100.000	Sum= 121.159

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	(0.419)	0.023	0.007
2	0.17	0.07	0.030	(0.417)	0.023	0.007
3	0.25	0.07	0.030	(0.416)	0.023	0.007
4	0.33	0.10	0.044	(0.414)	0.034	0.010
5	0.42	0.10	0.044	(0.413)	0.034	0.010
6	0.50	0.10	0.044	(0.411)	0.034	0.010
7	0.58	0.10	0.044	(0.409)	0.034	0.010
8	0.67	0.10	0.044	(0.408)	0.034	0.010
9	0.75	0.10	0.044	(0.406)	0.034	0.010
10	0.83	0.13	0.059	(0.405)	0.046	0.013
11	0.92	0.13	0.059	(0.403)	0.046	0.013
12	1.00	0.13	0.059	(0.401)	0.046	0.013
13	1.08	0.10	0.044	(0.400)	0.034	0.010
14	1.17	0.10	0.044	(0.398)	0.034	0.010
15	1.25	0.10	0.044	(0.397)	0.034	0.010
16	1.33	0.10	0.044	(0.395)	0.034	0.010
17	1.42	0.10	0.044	(0.393)	0.034	0.010
18	1.50	0.10	0.044	(0.392)	0.034	0.010
19	1.58	0.10	0.044	(0.390)	0.034	0.010
20	1.67	0.10	0.044	(0.389)	0.034	0.010
21	1.75	0.10	0.044	(0.387)	0.034	0.010
22	1.83	0.13	0.059	(0.386)	0.046	0.013
23	1.92	0.13	0.059	(0.384)	0.046	0.013
24	2.00	0.13	0.059	(0.383)	0.046	0.013
25	2.08	0.13	0.059	(0.381)	0.046	0.013
26	2.17	0.13	0.059	(0.379)	0.046	0.013
27	2.25	0.13	0.059	(0.378)	0.046	0.013
28	2.33	0.13	0.059	(0.376)	0.046	0.013
29	2.42	0.13	0.059	(0.375)	0.046	0.013
30	2.50	0.13	0.059	(0.373)	0.046	0.013
31	2.58	0.17	0.074	(0.372)	0.057	0.017
32	2.67	0.17	0.074	(0.370)	0.057	0.017
33	2.75	0.17	0.074	(0.369)	0.057	0.017
34	2.83	0.17	0.074	(0.367)	0.057	0.017
35	2.92	0.17	0.074	(0.366)	0.057	0.017
36	3.00	0.17	0.074	(0.364)	0.057	0.017
37	3.08	0.17	0.074	(0.363)	0.057	0.017
38	3.17	0.17	0.074	(0.361)	0.057	0.017
39	3.25	0.17	0.074	(0.360)	0.057	0.017
40	3.33	0.17	0.074	(0.358)	0.057	0.017
41	3.42	0.17	0.074	(0.357)	0.057	0.017
42	3.50	0.17	0.074	(0.355)	0.057	0.017
43	3.58	0.17	0.074	(0.354)	0.057	0.017
44	3.67	0.17	0.074	(0.352)	0.057	0.017
45	3.75	0.17	0.074	(0.351)	0.057	0.017
46	3.83	0.20	0.089	(0.349)	0.069	0.020
47	3.92	0.20	0.089	(0.348)	0.069	0.020
48	4.00	0.20	0.089	(0.346)	0.069	0.020
49	4.08	0.20	0.089	(0.345)	0.069	0.020
50	4.17	0.20	0.089	(0.343)	0.069	0.020
51	4.25	0.20	0.089	(0.342)	0.069	0.020
52	4.33	0.23	0.103	(0.340)	0.080	0.023
53	4.42	0.23	0.103	(0.339)	0.080	0.023
54	4.50	0.23	0.103	(0.338)	0.080	0.023
55	4.58	0.23	0.103	(0.336)	0.080	0.023
56	4.67	0.23	0.103	(0.335)	0.080	0.023
57	4.75	0.23	0.103	(0.333)	0.080	0.023
58	4.83	0.27	0.118	(0.332)	0.092	0.026
59	4.92	0.27	0.118	(0.330)	0.092	0.026
60	5.00	0.27	0.118	(0.329)	0.092	0.026
61	5.08	0.20	0.089	(0.327)	0.069	0.020
62	5.17	0.20	0.089	(0.326)	0.069	0.020
63	5.25	0.20	0.089	(0.325)	0.069	0.020
64	5.33	0.23	0.103	(0.323)	0.080	0.023
65	5.42	0.23	0.103	(0.322)	0.080	0.023
66	5.50	0.23	0.103	(0.320)	0.080	0.023
67	5.58	0.27	0.118	(0.319)	0.092	0.026
68	5.67	0.27	0.118	(0.318)	0.092	0.026
69	5.75	0.27	0.118	(0.316)	0.092	0.026
70	5.83	0.27	0.118	(0.315)	0.092	0.026
71	5.92	0.27	0.118	(0.313)	0.092	0.026
72	6.00	0.27	0.118	(0.312)	0.092	0.026
73	6.08	0.30	0.133	(0.311)	0.103	0.030
74	6.17	0.30	0.133	(0.309)	0.103	0.030
75	6.25	0.30	0.133	(0.308)	0.103	0.030
76	6.33	0.30	0.133	(0.306)	0.103	0.030
77	6.42	0.30	0.133	(0.305)	0.103	0.030
78	6.50	0.30	0.133	(0.304)	0.103	0.030
79	6.58	0.33	0.148	(0.302)	0.115	0.033
80	6.67	0.33	0.148	(0.301)	0.115	0.033
81	6.75	0.33	0.148	(0.300)	0.115	0.033
82	6.83	0.33	0.148	(0.298)	0.115	0.033
83	6.92	0.33	0.148	(0.297)	0.115	0.033
84	7.00	0.33	0.148	(0.296)	0.115	0.033
85	7.08	0.33	0.148	(0.294)	0.115	0.033
86	7.17	0.33	0.148	(0.293)	0.115	0.033
87	7.25	0.33	0.148	(0.292)	0.115	0.033
88	7.33	0.37	0.163	(0.290)	0.126	0.036
89	7.42	0.37	0.163	(0.289)	0.126	0.036
90	7.50	0.37	0.163	(0.288)	0.126	0.036
91	7.58	0.40	0.177	(0.286)	0.138	0.040
92	7.67	0.40	0.177	(0.285)	0.138	0.040
93	7.75	0.40	0.177	(0.284)	0.138	0.040
94	7.83	0.43	0.192	(0.282)	0.149	0.043
95	7.92	0.43	0.192	(0.281)	0.149	0.043
96	8.00	0.43	0.192	(0.280)	0.149	0.043
97	8.08	0.50	0.222	(0.278)	0.172	0.050
98	8.17	0.50	0.222	(0.277)	0.172	0.050
99	8.25	0.50	0.222	(0.276)	0.172	0.050
100	8.33	0.50	0.222	(0.275)	0.172	0.050
101	8.42	0.50	0.222	(0.273)	0.172	0.050
102	8.50	0.50	0.222	(0.272)	0.172	0.050
103	8.58	0.53	0.236	(0.271)	0.183	0.053
104	8.67	0.53	0.236	(0.269)	0.183	0.053
105	8.75	0.53	0.236	(0.268)	0.183	0.053
106	8.83	0.57	0.251	(0.267)	0.195	0.056
107	8.92	0.57	0.251	(0.266)	0.195	0.056
108	9.00	0.57	0.251	(0.264)	0.195	0.056
109	9.08	0.63	0.281	(0.263)	0.218	0.063
110	9.17	0.63	0.281	(0.262)	0.218	0.063
111	9.25	0.63	0.281	(0.261)	0.218	0.063
112	9.33	0.67	0.296	(0.259)	0.229	0.066
113	9.42	0.67	0.296	(0.258)	0.229	0.066
114	9.50	0.67	0.296	(0.257)	0.229	0.066
115	9.58	0.70	0.310	(0.256)	0.241	0.070
116	9.67	0.70	0.310	(0.254)	0.241	0.070
117	9.75	0.70	0.310	(0.253)	0.241	0.070

118	9.83	0.73	0.325	0.252	(0.252)	0.073
119	9.92	0.73	0.325	0.251	(0.252)	0.074
120	10.00	0.73	0.325	0.250	(0.252)	0.076
121	10.08	0.50	0.222	(0.248)	0.172	0.050
122	10.17	0.50	0.222	(0.247)	0.172	0.050
123	10.25	0.50	0.222	(0.246)	0.172	0.050
124	10.33	0.50	0.222	(0.245)	0.172	0.050
125	10.42	0.50	0.222	(0.244)	0.172	0.050
126	10.50	0.50	0.222	(0.242)	0.172	0.050
127	10.58	0.67	0.296	(0.241)	0.229	0.066
128	10.67	0.67	0.296	(0.240)	0.229	0.066
129	10.75	0.67	0.296	(0.239)	0.229	0.066
130	10.83	0.67	0.296	(0.238)	0.229	0.066
131	10.92	0.67	0.296	(0.237)	0.229	0.066
132	11.00	0.67	0.296	(0.235)	0.229	0.066
133	11.08	0.63	0.281	(0.234)	0.218	0.063
134	11.17	0.63	0.281	(0.233)	0.218	0.063
135	11.25	0.63	0.281	(0.232)	0.218	0.063
136	11.33	0.63	0.281	(0.231)	0.218	0.063
137	11.42	0.63	0.281	(0.230)	0.218	0.063
138	11.50	0.63	0.281	(0.228)	0.218	0.063
139	11.58	0.57	0.251	(0.227)	0.195	0.056
140	11.67	0.57	0.251	(0.226)	0.195	0.056
141	11.75	0.57	0.251	(0.225)	0.195	0.056
142	11.83	0.60	0.266	(0.224)	0.206	0.060
143	11.92	0.60	0.266	(0.223)	0.206	0.060
144	12.00	0.60	0.266	(0.222)	0.206	0.060
145	12.08	0.83	0.369	0.221	(0.287)	0.149
146	12.17	0.83	0.369	0.220	(0.287)	0.150
147	12.25	0.83	0.369	0.218	(0.287)	0.151
148	12.33	0.87	0.384	0.217	(0.298)	0.167
149	12.42	0.87	0.384	0.216	(0.298)	0.168
150	12.50	0.87	0.384	0.215	(0.298)	0.169
151	12.58	0.93	0.414	0.214	(0.321)	0.200
152	12.67	0.93	0.414	0.213	(0.321)	0.201
153	12.75	0.93	0.414	0.212	(0.321)	0.202
154	12.83	0.97	0.429	0.211	(0.333)	0.218
155	12.92	0.97	0.429	0.210	(0.333)	0.219
156	13.00	0.97	0.429	0.209	(0.333)	0.220
157	13.08	1.13	0.502	0.208	(0.390)	0.295
158	13.17	1.13	0.502	0.207	(0.390)	0.296
159	13.25	1.13	0.502	0.206	(0.390)	0.297
160	13.33	1.13	0.502	0.205	(0.390)	0.298
161	13.42	1.13	0.502	0.203	(0.390)	0.299
162	13.50	1.13	0.502	0.202	(0.390)	0.300
163	13.58	0.77	0.340	0.201	(0.264)	0.138
164	13.67	0.77	0.340	0.200	(0.264)	0.139
165	13.75	0.77	0.340	0.199	(0.264)	0.141
166	13.83	0.77	0.340	0.198	(0.264)	0.142
167	13.92	0.77	0.340	0.197	(0.264)	0.143
168	14.00	0.77	0.340	0.196	(0.264)	0.144
169	14.08	0.90	0.399	0.195	(0.310)	0.204
170	14.17	0.90	0.399	0.194	(0.310)	0.205
171	14.25	0.90	0.399	0.193	(0.310)	0.206
172	14.33	0.87	0.384	0.192	(0.298)	0.192
173	14.42	0.87	0.384	0.191	(0.298)	0.193
174	14.50	0.87	0.384	0.190	(0.298)	0.194
175	14.58	0.87	0.384	0.189	(0.298)	0.195
176	14.67	0.87	0.384	0.188	(0.298)	0.196
177	14.75	0.87	0.384	0.187	(0.298)	0.197
178	14.83	0.83	0.369	0.187	(0.287)	0.183
179	14.92	0.83	0.369	0.186	(0.287)	0.184
180	15.00	0.83	0.369	0.185	(0.287)	0.185
181	15.08	0.80	0.355	0.184	(0.275)	0.171
182	15.17	0.80	0.355	0.183	(0.275)	0.172
183	15.25	0.80	0.355	0.182	(0.275)	0.173
184	15.33	0.77	0.340	0.181	(0.264)	0.159
185	15.42	0.77	0.340	0.180	(0.264)	0.160
186	15.50	0.77	0.340	0.179	(0.264)	0.161
187	15.58	0.63	0.281	0.178	(0.218)	0.103
188	15.67	0.63	0.281	0.177	(0.218)	0.104
189	15.75	0.63	0.281	0.176	(0.218)	0.105
190	15.83	0.63	0.281	0.175	(0.218)	0.105
191	15.92	0.63	0.281	0.174	(0.218)	0.106
192	16.00	0.63	0.281	0.174	(0.218)	0.107
193	16.08	0.13	0.059	(0.173)	0.046	0.013
194	16.17	0.13	0.059	(0.172)	0.046	0.013
195	16.25	0.13	0.059	(0.171)	0.046	0.013
196	16.33	0.13	0.059	(0.170)	0.046	0.013
197	16.42	0.13	0.059	(0.169)	0.046	0.013
198	16.50	0.13	0.059	(0.168)	0.046	0.013
199	16.58	0.10	0.044	(0.167)	0.034	0.010
200	16.67	0.10	0.044	(0.167)	0.034	0.010
201	16.75	0.10	0.044	(0.166)	0.034	0.010
202	16.83	0.10	0.044	(0.165)	0.034	0.010
203	16.92	0.10	0.044	(0.164)	0.034	0.010
204	17.00	0.10	0.044	(0.163)	0.034	0.010
205	17.08	0.17	0.074	(0.162)	0.057	0.017
206	17.17	0.17	0.074	(0.162)	0.057	0.017
207	17.25	0.17	0.074	(0.161)	0.057	0.017
208	17.33	0.17	0.074	(0.160)	0.057	0.017
209	17.42	0.17	0.074	(0.159)	0.057	0.017
210	17.50	0.17	0.074	(0.158)	0.057	0.017
211	17.58	0.17	0.074	(0.158)	0.057	0.017
212	17.67	0.17	0.074	(0.157)	0.057	0.017
213	17.75	0.17	0.074	(0.156)	0.057	0.017
214	17.83	0.13	0.059	(0.155)	0.046	0.013
215	17.92	0.13	0.059	(0.155)	0.046	0.013
216	18.00	0.13	0.059	(0.154)	0.046	0.013
217	18.08	0.13	0.059	(0.153)	0.046	0.013
218	18.17	0.13	0.059	(0.152)	0.046	0.013
219	18.25	0.13	0.059	(0.151)	0.046	0.013
220	18.33	0.13	0.059	(0.151)	0.046	0.013
221	18.42	0.13	0.059	(0.150)	0.046	0.013
222	18.50	0.13	0.059	(0.149)	0.046	0.013
223	18.58	0.10	0.044	(0.149)	0.034	0.010
224	18.67	0.10	0.044	(0.148)	0.034	0.010
225	18.75	0.10	0.044	(0.147)	0.034	0.010
226	18.83	0.07	0.030	(0.146)	0.023	0.007
227	18.92	0.07	0.030	(0.146)	0.023	0.007
228	19.00	0.07	0.030	(0.145)	0.023	0.007
229	19.08	0.10	0.044	(0.144)	0.034	0.010
230	19.17	0.10	0.044	(0.144)	0.034	0.010
231	19.25	0.10	0.044	(0.143)	0.034	0.010
232	19.33	0.13	0.059	(0.142)	0.046	0.013
233	19.42	0.13	0.059	(0.142)	0.046	0.013
234	19.50	0.13	0.059	(0.141)	0.046	0.013
235	19.58	0.10	0.044	(0.140)	0.034	0.010
236	19.67	0.10	0.044	(0.140)	0.034	0.010
237	19.75	0.10	0.044	(0.139)	0.034	0.010

238	19.83	0.07	0.030	(0.138)	0.023	0.007
239	19.92	0.07	0.030	(0.138)	0.023	0.007
240	20.00	0.07	0.030	(0.137)	0.023	0.007
241	20.08	0.10	0.044	(0.137)	0.034	0.010
242	20.17	0.10	0.044	(0.136)	0.034	0.010
243	20.25	0.10	0.044	(0.135)	0.034	0.010
244	20.33	0.10	0.044	(0.135)	0.034	0.010
245	20.42	0.10	0.044	(0.134)	0.034	0.010
246	20.50	0.10	0.044	(0.134)	0.034	0.010
247	20.58	0.10	0.044	(0.133)	0.034	0.010
248	20.67	0.10	0.044	(0.133)	0.034	0.010
249	20.75	0.10	0.044	(0.132)	0.034	0.010
250	20.83	0.07	0.030	(0.132)	0.023	0.007
251	20.92	0.07	0.030	(0.131)	0.023	0.007
252	21.00	0.07	0.030	(0.130)	0.023	0.007
253	21.08	0.10	0.044	(0.130)	0.034	0.010
254	21.17	0.10	0.044	(0.129)	0.034	0.010
255	21.25	0.10	0.044	(0.129)	0.034	0.010
256	21.33	0.07	0.030	(0.128)	0.023	0.007
257	21.42	0.07	0.030	(0.128)	0.023	0.007
258	21.50	0.07	0.030	(0.127)	0.023	0.007
259	21.58	0.10	0.044	(0.127)	0.034	0.010
260	21.67	0.10	0.044	(0.127)	0.034	0.010
261	21.75	0.10	0.044	(0.126)	0.034	0.010
262	21.83	0.07	0.030	(0.126)	0.023	0.007
263	21.92	0.07	0.030	(0.125)	0.023	0.007
264	22.00	0.07	0.030	(0.125)	0.023	0.007
265	22.08	0.10	0.044	(0.124)	0.034	0.010
266	22.17	0.10	0.044	(0.124)	0.034	0.010
267	22.25	0.10	0.044	(0.124)	0.034	0.010
268	22.33	0.07	0.030	(0.123)	0.023	0.007
269	22.42	0.07	0.030	(0.123)	0.023	0.007
270	22.50	0.07	0.030	(0.122)	0.023	0.007
271	22.58	0.07	0.030	(0.122)	0.023	0.007
272	22.67	0.07	0.030	(0.122)	0.023	0.007
273	22.75	0.07	0.030	(0.121)	0.023	0.007
274	22.83	0.07	0.030	(0.121)	0.023	0.007
275	22.92	0.07	0.030	(0.121)	0.023	0.007
276	23.00	0.07	0.030	(0.121)	0.023	0.007
277	23.08	0.07	0.030	(0.120)	0.023	0.007
278	23.17	0.07	0.030	(0.120)	0.023	0.007
279	23.25	0.07	0.030	(0.120)	0.023	0.007
280	23.33	0.07	0.030	(0.119)	0.023	0.007
281	23.42	0.07	0.030	(0.119)	0.023	0.007
282	23.50	0.07	0.030	(0.119)	0.023	0.007
283	23.58	0.07	0.030	(0.119)	0.023	0.007
284	23.67	0.07	0.030	(0.119)	0.023	0.007
285	23.75	0.07	0.030	(0.119)	0.023	0.007
286	23.83	0.07	0.030	(0.118)	0.023	0.007
287	23.92	0.07	0.030	(0.118)	0.023	0.007
288	24.00	0.07	0.030	(0.118)	0.023	0.007

(Loss Rate Not Used)

Sum = 100.0 Sum = 14.7

Flood volume = Effective rainfall 1.22(In)
times area 120.2(Ac.)/[(In)/(Ft.)] = 12.2(Ac.Ft)
Total soil loss = 2.47(In)
Total soil loss = 24.778(Ac.Ft)
Total rainfall = 3.69(In)
Flood volume = 532861.6 Cubic Feet
Total soil loss = 1079332.5 Cubic Feet

Peak flow rate of this hydrograph = 33.296(CFS)

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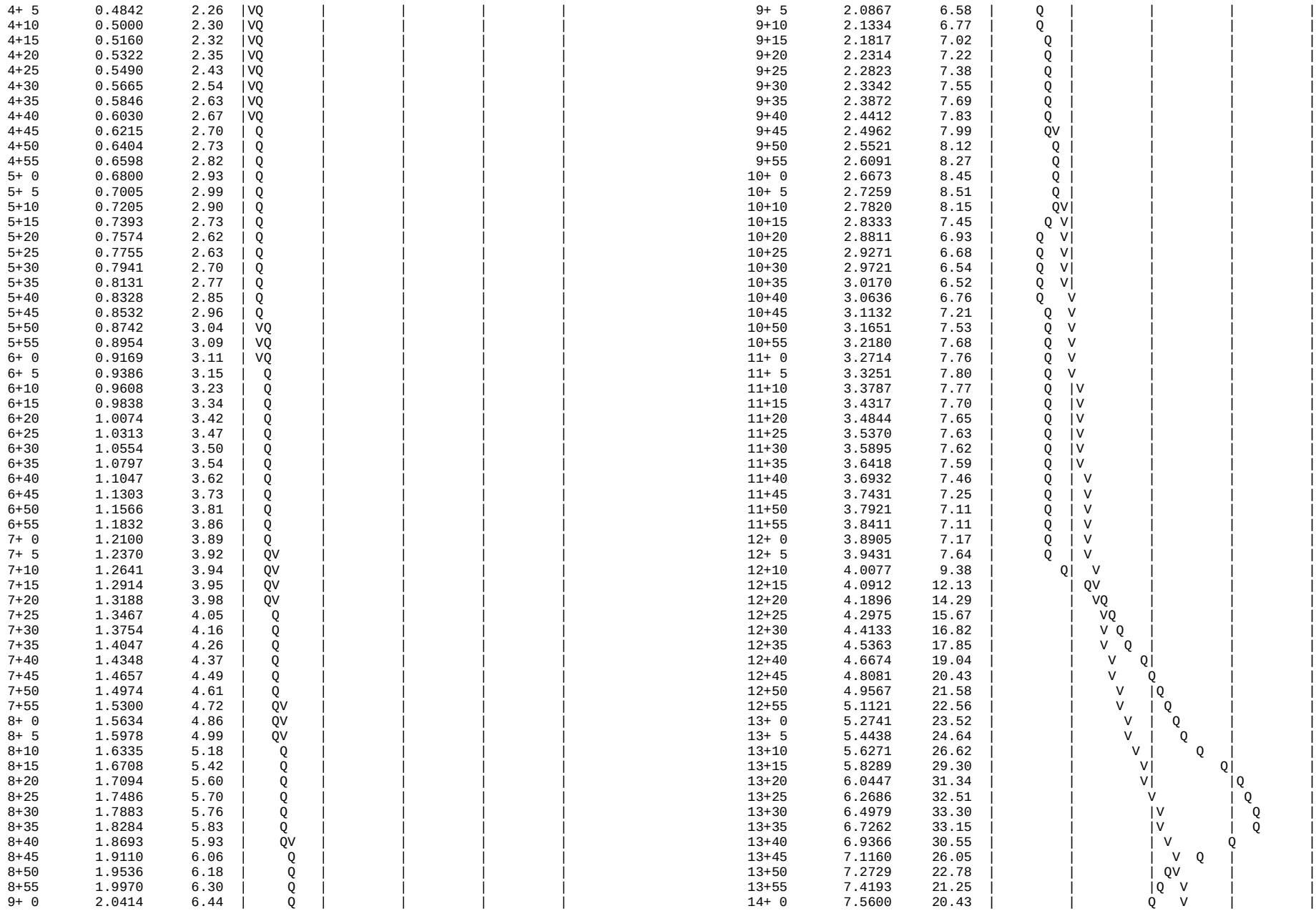
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0002	0.03	Q				
0+10	0.0013	0.16	Q				
0+15	0.0038	0.36	Q				
0+20	0.0074	0.53	Q				
0+25	0.0120	0.67	Q				
0+30	0.0176	0.81	Q				
0+35	0.0239	0.92	Q				
0+40	0.0307	0.98	Q				
0+45	0.0378	1.03	VQ				
0+50	0.0452	1.08	VQ				
0+55	0.0532	1.17	VQ				
1+ 0	0.0621	1.29	VQ				
1+ 5	0.0715	1.36	VQ				
1+10	0.0808	1.35	VQ				
1+15	0.0897	1.29	VQ				
1+20	0.0982	1.24	VQ				
1+25	0.1067	1.22	VQ				
1+30	0.1150	1.22	VQ				
1+35	0.1234	1.22	VQ				
1+40	0.1318	1.22	VQ				
1+45	0.1402	1.22	VQ				
1+50	0.1487	1.23	VQ				
1+55	0.1576	1.29	VQ				
2+ 0	0.1672	1.40	VQ				
2+ 5	0.1773	1.47	VQ				
2+10	0.1877	1.51	VQ				
2+15	0.1982	1.53	VQ				
2+20	0.2088	1.54	VQ				
2+25	0.2195	1.55	VQ				
2+30	0.2303	1.56	VQ				
2+35	0.2412	1.59	VQ				
2+40	0.2526	1.66	VQ				
2+45	0.2648	1.76	VQ				
2+50	0.2774	1.84	VQ				
2+55	0.2904	1.88	VQ				
3+ 0	0.3035	1.91	VQ				
3+ 5	0.3168	1.93	|Q				
3+10	0.3302	1.94	|Q				
3+15	0.3436	1.95	|Q				
3+20	0.3572	1.96	|Q				
3+25	0.3708	1.97	|Q				
3+30	0.3844	1.98	|Q				
3+35	0.3981	1.99	|Q				
3+40	0.4118	1.99	|Q				
3+45	0.4255	1.99	|Q				
3+50	0.4393	2.01	|VQ				
3+55	0.4537	2.08	|VQ				
4+ 0	0.4687	2.18	|VQ				



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  24+ 5      12.2159      0.77  Q         |         |         |        V|
  24+10      12.2203      0.64  Q         |         |         |        V|
  24+15      12.2234      0.44  Q         |         |         |        V|
  24+20      12.2254      0.29  Q         |         |         |        V|
  24+25      12.2269      0.22  Q         |         |         |        V|
  24+30      12.2280      0.17  Q         |         |         |        V|
  24+35      12.2290      0.14  Q         |         |         |        V|
  24+40      12.2298      0.11  Q         |         |         |        V|
  24+45      12.2304      0.09  Q         |         |         |        V|
  24+50      12.2309      0.07  Q         |         |         |        V|
  24+55      12.2313      0.06  Q         |         |         |        V|
  25+ 0      12.2317      0.05  Q         |         |         |        V|
  25+ 5      12.2320      0.04  Q         |         |         |        V|
  25+10      12.2322      0.03  Q         |         |         |        V|
  25+15      12.2324      0.03  Q         |         |         |        V|
  25+20      12.2325      0.02  Q         |         |         |        V|
  25+25      12.2326      0.02  Q         |         |         |        V|
  25+30      12.2327      0.01  Q         |         |         |        V|
  25+35      12.2328      0.01  Q         |         |         |        V|
  25+40      12.2328      0.01  Q         |         |         |        V|
  25+45      12.2328      0.00  Q         |         |         |         V
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DRAINAGE AREA H

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
Study date 10/16/23 File: crph10uh2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6406

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

CRESCENT GARDENS
Proposed Conditions
AREA H
10/16/23

Drainage Area = 8.53(Ac.) = 0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 8.53(Ac.) = 0.013 Sq. Mi.
Length along longest watercourse = 2153.90(Ft.)
Length along longest watercourse measured to centroid = 668.00(Ft.)
Length along longest watercourse = 0.408 Mi.
Length along longest watercourse measured to centroid = 0.127 Mi.
Difference in elevation = 59.50(Ft.)
Slope along watercourse = 145.8564 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.060 Hr.
Lag time = 3.62 Min.
25% of lag time = 0.91 Min.
40% of lag time = 1.45 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.53	2.21	18.85

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
8.53	5.82	49.64

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.210(In)
Area Averaged 100-Year Rainfall = 5.820(In)

Point rain (area averaged) = 3.695(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.695(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.430	89.00	0.000
5.570	75.00	0.000
1.530	98.00	0.900

Total Area Entered = 8.53(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
89.0	89.0	0.141	0.000	0.141	0.168	0.024
75.0	75.0	0.303	0.000	0.303	0.653	0.198
98.0	98.0	0.026	0.900	0.005	0.179	0.001
					Sum (F) =	0.222

Area averaged mean soil loss (F) (In/Hr) = 0.222
Minimum soil loss rate ((In/Hr)) = 0.111
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.760

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	138.002	30.158	2.593
2	0.167	276.003	47.834	4.112
3	0.250	414.005	11.937	1.026
4	0.333	552.007	5.273	0.453
5	0.417	690.008	2.835	0.244
6	0.500	828.010	1.962	0.169
		Sum = 100.000	Sum=	8.597

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	(0.394)	0.022	0.007
2	0.17	0.07	0.030	(0.393)	0.022	0.007
3	0.25	0.07	0.030	(0.391)	0.022	0.007
4	0.33	0.10	0.044	(0.390)	0.034	0.011
5	0.42	0.10	0.044	(0.388)	0.034	0.011
6	0.50	0.10	0.044	(0.387)	0.034	0.011
7	0.58	0.10	0.044	(0.385)	0.034	0.011
8	0.67	0.10	0.044	(0.384)	0.034	0.011
9	0.75	0.10	0.044	(0.382)	0.034	0.011

10	0.83	0.13	0.059	(0.381)	0.045	0.014
11	0.92	0.13	0.059	(0.379)	0.045	0.014
12	1.00	0.13	0.059	(0.378)	0.045	0.014
13	1.08	0.10	0.044	(0.376)	0.034	0.011
14	1.17	0.10	0.044	(0.375)	0.034	0.011
15	1.25	0.10	0.044	(0.373)	0.034	0.011
16	1.33	0.10	0.044	(0.372)	0.034	0.011
17	1.42	0.10	0.044	(0.370)	0.034	0.011
18	1.50	0.10	0.044	(0.369)	0.034	0.011
19	1.58	0.10	0.044	(0.367)	0.034	0.011
20	1.67	0.10	0.044	(0.366)	0.034	0.011
21	1.75	0.10	0.044	(0.364)	0.034	0.011
22	1.83	0.13	0.059	(0.363)	0.045	0.014
23	1.92	0.13	0.059	(0.361)	0.045	0.014
24	2.00	0.13	0.059	(0.360)	0.045	0.014
25	2.08	0.13	0.059	(0.359)	0.045	0.014
26	2.17	0.13	0.059	(0.357)	0.045	0.014
27	2.25	0.13	0.059	(0.356)	0.045	0.014
28	2.33	0.13	0.059	(0.354)	0.045	0.014
29	2.42	0.13	0.059	(0.353)	0.045	0.014
30	2.50	0.13	0.059	(0.351)	0.045	0.014
31	2.58	0.17	0.074	(0.350)	0.056	0.018
32	2.67	0.17	0.074	(0.348)	0.056	0.018
33	2.75	0.17	0.074	(0.347)	0.056	0.018
34	2.83	0.17	0.074	(0.346)	0.056	0.018
35	2.92	0.17	0.074	(0.344)	0.056	0.018
36	3.00	0.17	0.074	(0.343)	0.056	0.018
37	3.08	0.17	0.074	(0.341)	0.056	0.018
38	3.17	0.17	0.074	(0.340)	0.056	0.018
39	3.25	0.17	0.074	(0.338)	0.056	0.018
40	3.33	0.17	0.074	(0.337)	0.056	0.018
41	3.42	0.17	0.074	(0.336)	0.056	0.018
42	3.50	0.17	0.074	(0.334)	0.056	0.018
43	3.58	0.17	0.074	(0.333)	0.056	0.018
44	3.67	0.17	0.074	(0.331)	0.056	0.018
45	3.75	0.17	0.074	(0.330)	0.056	0.018
46	3.83	0.20	0.089	(0.329)	0.067	0.021
47	3.92	0.20	0.089	(0.327)	0.067	0.021
48	4.00	0.20	0.089	(0.326)	0.067	0.021
49	4.08	0.20	0.089	(0.325)	0.067	0.021
50	4.17	0.20	0.089	(0.323)	0.067	0.021
51	4.25	0.20	0.089	(0.322)	0.067	0.021
52	4.33	0.23	0.103	(0.320)	0.079	0.025
53	4.42	0.23	0.103	(0.319)	0.079	0.025
54	4.50	0.23	0.103	(0.318)	0.079	0.025
55	4.58	0.23	0.103	(0.316)	0.079	0.025
56	4.67	0.23	0.103	(0.315)	0.079	0.025
57	4.75	0.23	0.103	(0.314)	0.079	0.025
58	4.83	0.27	0.118	(0.312)	0.090	0.028
59	4.92	0.27	0.118	(0.311)	0.090	0.028
60	5.00	0.27	0.118	(0.310)	0.090	0.028
61	5.08	0.20	0.089	(0.308)	0.067	0.021
62	5.17	0.20	0.089	(0.307)	0.067	0.021
63	5.25	0.20	0.089	(0.306)	0.067	0.021
64	5.33	0.23	0.103	(0.304)	0.079	0.025
65	5.42	0.23	0.103	(0.303)	0.079	0.025
66	5.50	0.23	0.103	(0.302)	0.079	0.025
67	5.58	0.27	0.118	(0.300)	0.090	0.028
68	5.67	0.27	0.118	(0.299)	0.090	0.028
69	5.75	0.27	0.118	(0.298)	0.090	0.028
70	5.83	0.27	0.118	(0.296)	0.090	0.028
71	5.92	0.27	0.118	(0.295)	0.090	0.028
72	6.00	0.27	0.118	(0.294)	0.090	0.028
73	6.08	0.30	0.133	(0.292)	0.101	0.032
74	6.17	0.30	0.133	(0.291)	0.101	0.032
75	6.25	0.30	0.133	(0.290)	0.101	0.032
76	6.33	0.30	0.133	(0.288)	0.101	0.032
77	6.42	0.30	0.133	(0.287)	0.101	0.032
78	6.50	0.30	0.133	(0.286)	0.101	0.032
79	6.58	0.33	0.148	(0.285)	0.112	0.035
80	6.67	0.33	0.148	(0.283)	0.112	0.035
81	6.75	0.33	0.148	(0.282)	0.112	0.035
82	6.83	0.33	0.148	(0.281)	0.112	0.035
83	6.92	0.33	0.148	(0.279)	0.112	0.035
84	7.00	0.33	0.148	(0.278)	0.112	0.035
85	7.08	0.33	0.148	(0.277)	0.112	0.035
86	7.17	0.33	0.148	(0.276)	0.112	0.035
87	7.25	0.33	0.148	(0.274)	0.112	0.035
88	7.33	0.37	0.163	(0.273)	0.124	0.039
89	7.42	0.37	0.163	(0.272)	0.124	0.039
90	7.50	0.37	0.163	(0.271)	0.124	0.039
91	7.58	0.40	0.177	(0.269)	0.135	0.043
92	7.67	0.40	0.177	(0.268)	0.135	0.043
93	7.75	0.40	0.177	(0.267)	0.135	0.043
94	7.83	0.43	0.192	(0.266)	0.146	0.046
95	7.92	0.43	0.192	(0.264)	0.146	0.046
96	8.00	0.43	0.192	(0.263)	0.146	0.046
97	8.08	0.50	0.222	(0.262)	0.168	0.053
98	8.17	0.50	0.222	(0.261)	0.168	0.053
99	8.25	0.50	0.222	(0.260)	0.168	0.053
100	8.33	0.50	0.222	(0.258)	0.168	0.053
101	8.42	0.50	0.222	(0.257)	0.168	0.053
102	8.50	0.50	0.222	(0.256)	0.168	0.053
103	8.58	0.53	0.236	(0.255)	0.180	0.057
104	8.67	0.53	0.236	(0.254)	0.180	0.057
105	8.75	0.53	0.236	(0.252)	0.180	0.057
106	8.83	0.57	0.251	(0.251)	0.191	0.060
107	8.92	0.57	0.251	(0.250)	0.191	0.060
108	9.00	0.57	0.251	(0.249)	0.191	0.060
109	9.08	0.63	0.281	(0.248)	0.213	0.067
110	9.17	0.63	0.281	(0.246)	0.213	0.067
111	9.25	0.63	0.281	(0.245)	0.213	0.067
112	9.33	0.67	0.296	(0.244)	0.225	0.071
113	9.42	0.67	0.296	(0.243)	0.225	0.071
114	9.50	0.67	0.296	(0.242)	0.225	0.071
115	9.58	0.70	0.310	(0.241)	0.236	0.074
116	9.67	0.70	0.310	(0.239)	0.236	0.074
117	9.75	0.70	0.310	(0.238)	0.236	0.074
118	9.83	0.73	0.325	0.237	(0.247)	0.088
119	9.92	0.73	0.325	0.236	(0.247)	0.089
120	10.00	0.73	0.325	0.235	(0.247)	0.090
121	10.08	0.50	0.222	(0.234)	0.168	0.053
122	10.17	0.50	0.222	(0.233)	0.168	0.053
123	10.25	0.50	0.222	(0.232)	0.168	0.053
124	10.33	0.50	0.222	(0.230)	0.168	0.053
125	10.42	0.50	0.222	(0.229)	0.168	0.053
126	10.50	0.50	0.222	(0.228)	0.168	0.053
127	10.58	0.67	0.296	(0.227)	0.225	0.071
128	10.67	0.67	0.296	(0.226)	0.225	0.071
129	10.75	0.67	0.296	(0.225)	0.225	0.071

130	10.83	0.67	0.296	0.224	(0.225)	0.072
131	10.92	0.67	0.296	0.223	(0.225)	0.073
132	11.00	0.67	0.296	0.222	(0.225)	0.074
133	11.08	0.63	0.281	(0.220)	0.213	0.067
134	11.17	0.63	0.281	(0.219)	0.213	0.067
135	11.25	0.63	0.281	(0.218)	0.213	0.067
136	11.33	0.63	0.281	(0.217)	0.213	0.067
137	11.42	0.63	0.281	(0.216)	0.213	0.067
138	11.50	0.63	0.281	(0.215)	0.213	0.067
139	11.58	0.57	0.251	(0.214)	0.191	0.060
140	11.67	0.57	0.251	(0.213)	0.191	0.060
141	11.75	0.57	0.251	(0.212)	0.191	0.060
142	11.83	0.60	0.266	(0.211)	0.202	0.064
143	11.92	0.60	0.266	(0.210)	0.202	0.064
144	12.00	0.60	0.266	(0.209)	0.202	0.064
145	12.08	0.83	0.370	0.208	(0.281)	0.162
146	12.17	0.83	0.370	0.207	(0.281)	0.163
147	12.25	0.83	0.370	0.206	(0.281)	0.164
148	12.33	0.87	0.384	0.205	(0.292)	0.180
149	12.42	0.87	0.384	0.204	(0.292)	0.181
150	12.50	0.87	0.384	0.202	(0.292)	0.182
151	12.58	0.93	0.414	0.201	(0.315)	0.212
152	12.67	0.93	0.414	0.200	(0.315)	0.213
153	12.75	0.93	0.414	0.199	(0.315)	0.214
154	12.83	0.97	0.429	0.198	(0.326)	0.230
155	12.92	0.97	0.429	0.197	(0.326)	0.231
156	13.00	0.97	0.429	0.196	(0.326)	0.232
157	13.08	1.13	0.503	0.195	(0.382)	0.307
158	13.17	1.13	0.503	0.194	(0.382)	0.308
159	13.25	1.13	0.503	0.193	(0.382)	0.309
160	13.33	1.13	0.503	0.192	(0.382)	0.310
161	13.42	1.13	0.503	0.192	(0.382)	0.311
162	13.50	1.13	0.503	0.191	(0.382)	0.312
163	13.58	0.77	0.340	0.190	(0.258)	0.150
164	13.67	0.77	0.340	0.189	(0.258)	0.151
165	13.75	0.77	0.340	0.188	(0.258)	0.152
166	13.83	0.77	0.340	0.187	(0.258)	0.153
167	13.92	0.77	0.340	0.186	(0.258)	0.154
168	14.00	0.77	0.340	0.185	(0.258)	0.155
169	14.08	0.90	0.399	0.184	(0.303)	0.215
170	14.17	0.90	0.399	0.183	(0.303)	0.216
171	14.25	0.90	0.399	0.182	(0.303)	0.217
172	14.33	0.87	0.384	0.181	(0.292)	0.203
173	14.42	0.87	0.384	0.180	(0.292)	0.204
174	14.50	0.87	0.384	0.179	(0.292)	0.205
175	14.58	0.87	0.384	0.178	(0.292)	0.206
176	14.67	0.87	0.384	0.177	(0.292)	0.207
177	14.75	0.87	0.384	0.176	(0.292)	0.208
178	14.83	0.83	0.370	0.176	(0.281)	0.194
179	14.92	0.83	0.370	0.175	(0.281)	0.195
180	15.00	0.83	0.370	0.174	(0.281)	0.196
181	15.08	0.80	0.355	0.173	(0.270)	0.182
182	15.17	0.80	0.355	0.172	(0.270)	0.183
183	15.25	0.80	0.355	0.171	(0.270)	0.184
184	15.33	0.77	0.340	0.170	(0.258)	0.170
185	15.42	0.77	0.340	0.169	(0.258)	0.171
186	15.50	0.77	0.340	0.168	(0.258)	0.171
187	15.58	0.63	0.281	0.168	(0.213)	0.113
188	15.67	0.63	0.281	0.167	(0.213)	0.114
189	15.75	0.63	0.281	0.166	(0.213)	0.115
190	15.83	0.63	0.281	0.165	(0.213)	0.116
191	15.92	0.63	0.281	0.164	(0.213)	0.117
192	16.00	0.63	0.281	0.163	(0.213)	0.117
193	16.08	0.13	0.059	(0.163)	0.045	0.014
194	16.17	0.13	0.059	(0.162)	0.045	0.014
195	16.25	0.13	0.059	(0.161)	0.045	0.014
196	16.33	0.13	0.059	(0.160)	0.045	0.014
197	16.42	0.13	0.059	(0.159)	0.045	0.014
198	16.50	0.13	0.059	(0.158)	0.045	0.014
199	16.58	0.10	0.044	(0.158)	0.034	0.011
200	16.67	0.10	0.044	(0.157)	0.034	0.011
201	16.75	0.10	0.044	(0.156)	0.034	0.011
202	16.83	0.10	0.044	(0.155)	0.034	0.011
203	16.92	0.10	0.044	(0.154)	0.034	0.011
204	17.00	0.10	0.044	(0.154)	0.034	0.011
205	17.08	0.17	0.074	(0.153)	0.056	0.018
206	17.17	0.17	0.074	(0.152)	0.056	0.018
207	17.25	0.17	0.074	(0.151)	0.056	0.018
208	17.33	0.17	0.074	(0.151)	0.056	0.018
209	17.42	0.17	0.074	(0.150)	0.056	0.018
210	17.50	0.17	0.074	(0.149)	0.056	0.018
211	17.58	0.17	0.074	(0.148)	0.056	0.018
212	17.67	0.17	0.074	(0.148)	0.056	0.018
213	17.75	0.17	0.074	(0.147)	0.056	0.018
214	17.83	0.13	0.059	(0.146)	0.045	0.014
215	17.92	0.13	0.059	(0.145)	0.045	0.014
216	18.00	0.13	0.059	(0.145)	0.045	0.014
217	18.08	0.13	0.059	(0.144)	0.045	0.014
218	18.17	0.13	0.059	(0.143)	0.045	0.014
219	18.25	0.13	0.059	(0.143)	0.045	0.014
220	18.33	0.13	0.059	(0.142)	0.045	0.014
221	18.42	0.13	0.059	(0.141)	0.045	0.014
222	18.50	0.13	0.059	(0.140)	0.045	0.014
223	18.58	0.10	0.044	(0.140)	0.034	0.011
224	18.67	0.10	0.044	(0.139)	0.034	0.011
225	18.75	0.10	0.044	(0.138)	0.034	0.011
226	18.83	0.07	0.030	(0.138)	0.022	0.007
227	18.92	0.07	0.030	(0.137)	0.022	0.007
228	19.00	0.07	0.030	(0.137)	0.022	0.007
229	19.08	0.10	0.044	(0.136)	0.034	0.011
230	19.17	0.10	0.044	(0.135)	0.034	0.011
231	19.25	0.10	0.044	(0.135)	0.034	0.011
232	19.33	0.13	0.059	(0.134)	0.045	0.014
233	19.42	0.13	0.059	(0.133)	0.045	0.014
234	19.50	0.13	0.059	(0.133)	0.045	0.014
235	19.58	0.10	0.044	(0.132)	0.034	0.011
236	19.67	0.10	0.044	(0.132)	0.034	0.011
237	19.75	0.10	0.044	(0.131)	0.034	0.011
238	19.83	0.07	0.030	(0.130)	0.022	0.007
239	19.92	0.07	0.030	(0.130)	0.022	0.007
240	20.00	0.07	0.030	(0.129)	0.022	0.007
241	20.08	0.10	0.044	(0.129)	0.034	0.011
242	20.17	0.10	0.044	(0.128)	0.034	0.011
243	20.25	0.10	0.044	(0.127)	0.034	0.011
244	20.33	0.10	0.044	(0.127)	0.034	0.011
245	20.42	0.10	0.044	(0.126)	0.034	0.011
246	20.50	0.10	0.044	(0.126)	0.034	0.011
247	20.58	0.10	0.044	(0.125)	0.034	0.011
248	20.67	0.10	0.044	(0.125)	0.034	0.011
249	20.75	0.10	0.044	(0.124)	0.034	0.011

250	20.83	0.07	0.030	(0.124)	0.022	0.007
251	20.92	0.07	0.030	(0.123)	0.022	0.007
252	21.00	0.07	0.030	(0.123)	0.022	0.007
253	21.08	0.10	0.044	(0.122)	0.034	0.011
254	21.17	0.10	0.044	(0.122)	0.034	0.011
255	21.25	0.10	0.044	(0.121)	0.034	0.011
256	21.33	0.07	0.030	(0.121)	0.022	0.007
257	21.42	0.07	0.030	(0.120)	0.022	0.007
258	21.50	0.07	0.030	(0.120)	0.022	0.007
259	21.58	0.10	0.044	(0.120)	0.034	0.011
260	21.67	0.10	0.044	(0.119)	0.034	0.011
261	21.75	0.10	0.044	(0.119)	0.034	0.011
262	21.83	0.07	0.030	(0.118)	0.022	0.007
263	21.92	0.07	0.030	(0.118)	0.022	0.007
264	22.00	0.07	0.030	(0.117)	0.022	0.007
265	22.08	0.10	0.044	(0.117)	0.034	0.011
266	22.17	0.10	0.044	(0.117)	0.034	0.011
267	22.25	0.10	0.044	(0.116)	0.034	0.011
268	22.33	0.07	0.030	(0.116)	0.022	0.007
269	22.42	0.07	0.030	(0.116)	0.022	0.007
270	22.50	0.07	0.030	(0.115)	0.022	0.007
271	22.58	0.07	0.030	(0.115)	0.022	0.007
272	22.67	0.07	0.030	(0.115)	0.022	0.007
273	22.75	0.07	0.030	(0.114)	0.022	0.007
274	22.83	0.07	0.030	(0.114)	0.022	0.007
275	22.92	0.07	0.030	(0.114)	0.022	0.007
276	23.00	0.07	0.030	(0.113)	0.022	0.007
277	23.08	0.07	0.030	(0.113)	0.022	0.007
278	23.17	0.07	0.030	(0.113)	0.022	0.007
279	23.25	0.07	0.030	(0.113)	0.022	0.007
280	23.33	0.07	0.030	(0.112)	0.022	0.007
281	23.42	0.07	0.030	(0.112)	0.022	0.007
282	23.50	0.07	0.030	(0.112)	0.022	0.007
283	23.58	0.07	0.030	(0.112)	0.022	0.007
284	23.67	0.07	0.030	(0.112)	0.022	0.007
285	23.75	0.07	0.030	(0.112)	0.022	0.007
286	23.83	0.07	0.030	(0.111)	0.022	0.007
287	23.92	0.07	0.030	(0.111)	0.022	0.007
288	24.00	0.07	0.030	(0.111)	0.022	0.007

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.7

Flood volume = Effective rainfall 1.31(In)
times area 8.5(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)
Total soil loss = 2.39(In)
Total soil loss = 1.699(Ac.Ft)
Total rainfall = 3.70(In)
Flood volume = 40421.6 Cubic Feet
Total soil loss = 73993.8 Cubic Feet

Peak flow rate of this hydrograph = 2.674(CFS)

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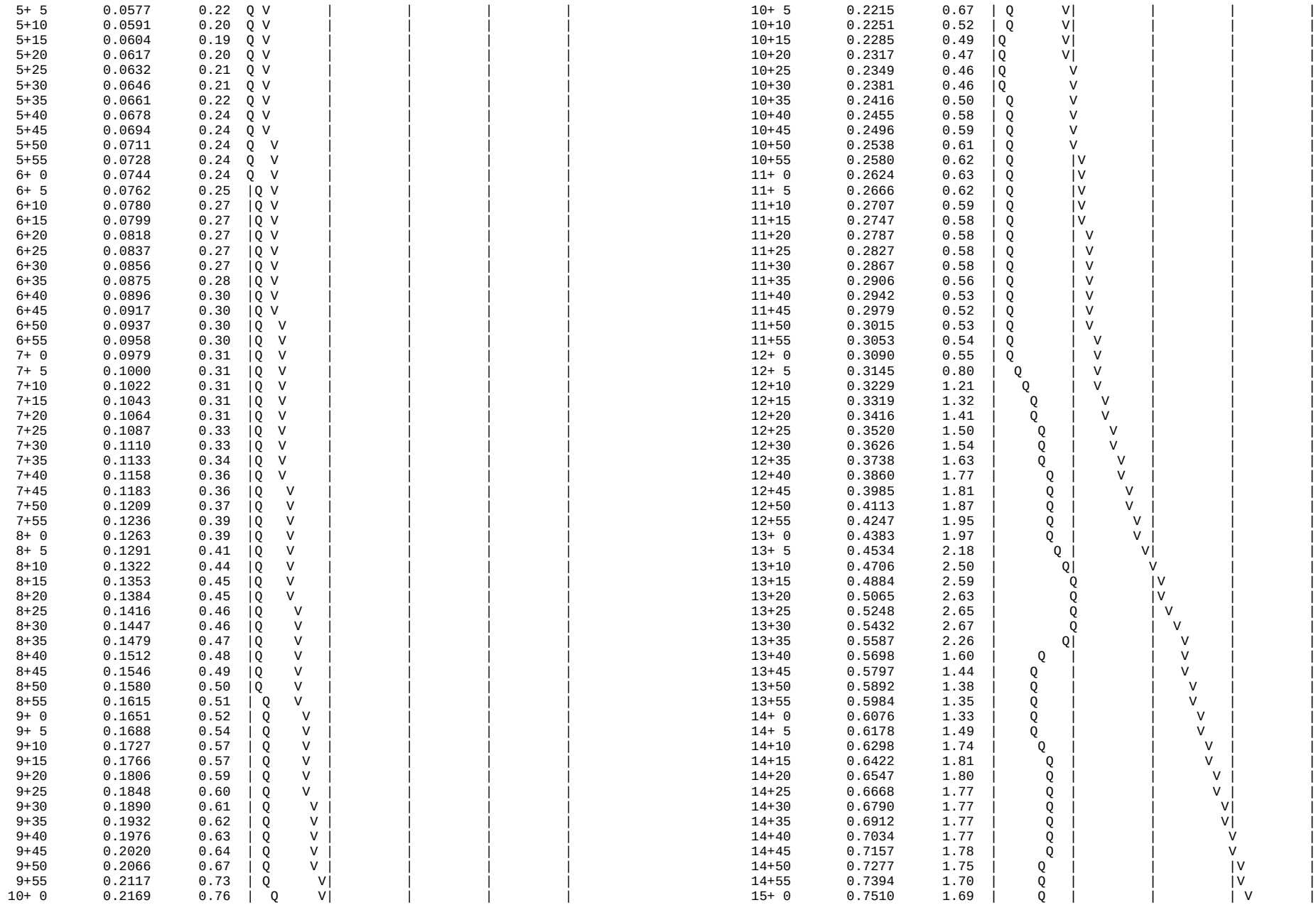
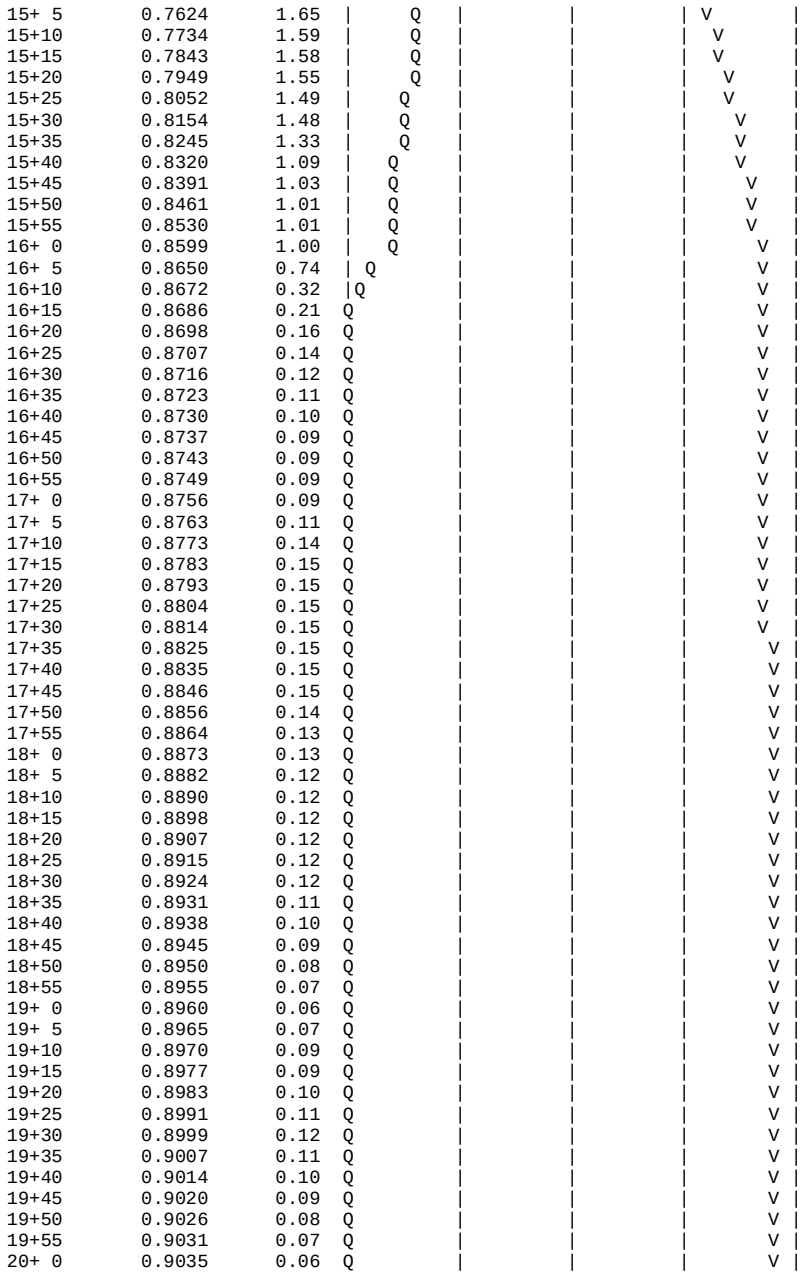
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q				
0+10	0.0005	0.05	Q				
0+15	0.0008	0.05	Q				
0+20	0.0013	0.07	Q				
0+25	0.0019	0.08	Q				
0+30	0.0025	0.09	Q				
0+35	0.0031	0.09	Q				
0+40	0.0037	0.09	Q				
0+45	0.0044	0.09	Q				
0+50	0.0051	0.10	Q				
0+55	0.0058	0.12	Q				
1+ 0	0.0067	0.12	Q				
1+ 5	0.0074	0.11	Q				
1+10	0.0081	0.10	Q				
1+15	0.0088	0.09	Q				
1+20	0.0094	0.09	Q				
1+25	0.0100	0.09	Q				
1+30	0.0107	0.09	Q				
1+35	0.0113	0.09	Q				
1+40	0.0119	0.09	Q				
1+45	0.0126	0.09	Q				
1+50	0.0132	0.10	Q				
1+55	0.0140	0.12	Q				
2+ 0	0.0149	0.12	Q				
2+ 5	0.0157	0.12	Q				
2+10	0.0165	0.12	Q				
2+15	0.0174	0.12	Q				
2+20	0.0182	0.12	Q				
2+25	0.0190	0.12	Q				
2+30	0.0199	0.12	Q				
2+35	0.0208	0.13	Q				
2+40	0.0218	0.15	Q				
2+45	0.0228	0.15	Q				
2+50	0.0239	0.15	QV				
2+55	0.0249	0.15	QV				
3+ 0	0.0260	0.15	QV				
3+ 5	0.0270	0.15	QV				
3+10	0.0281	0.15	QV				
3+15	0.0291	0.15	QV				
3+20	0.0302	0.15	QV				
3+25	0.0312	0.15	QV				
3+30	0.0323	0.15	QV				
3+35	0.0333	0.15	QV				
3+40	0.0344	0.15	QV				
3+45	0.0354	0.15	QV				
3+50	0.0365	0.16	QV				
3+55	0.0377	0.18	QV				
4+ 0	0.0390	0.18	QV				
4+ 5	0.0402	0.18	QV				
4+10	0.0415	0.18	QV				
4+15	0.0428	0.18	QV				
4+20	0.0441	0.19	QV				
4+25	0.0455	0.21	QV				
4+30	0.0470	0.21	Q V				
4+35	0.0484	0.21	Q V				
4+40	0.0499	0.21	Q V				
4+45	0.0514	0.21	Q V				
4+50	0.0529	0.22	Q V				
4+55	0.0545	0.24	Q V				
5+ 0	0.0562	0.24	Q V				





15+ 5	0.7624	1.65	Q			V
15+10	0.7734	1.59	Q			V
15+15	0.7843	1.58	Q			V
15+20	0.7949	1.55	Q			V
15+25	0.8052	1.49	Q			V
15+30	0.8154	1.48	Q			V
15+35	0.8245	1.33	Q			V
15+40	0.8320	1.09	Q			V
15+45	0.8391	1.03	Q			V
15+50	0.8461	1.01	Q			V
15+55	0.8530	1.01	Q			V
16+ 0	0.8599	1.00	Q			V
16+ 5	0.8650	0.74	Q			V
16+10	0.8672	0.32	Q			V
16+15	0.8686	0.21	Q			V
16+20	0.8698	0.16	Q			V
16+25	0.8707	0.14	Q			V
16+30	0.8716	0.12	Q			V
16+35	0.8723	0.11	Q			V
16+40	0.8730	0.10	Q			V
16+45	0.8737	0.09	Q			V
16+50	0.8743	0.09	Q			V
16+55	0.8749	0.09	Q			V
17+ 0	0.8756	0.09	Q			V
17+ 5	0.8763	0.11	Q			V
17+10	0.8773	0.14	Q			V
17+15	0.8783	0.15	Q			V
17+20	0.8793	0.15	Q			V
17+25	0.8804	0.15	Q			V
17+30	0.8814	0.15	Q			V
17+35	0.8825	0.15	Q			V
17+40	0.8835	0.15	Q			V
17+45	0.8846	0.15	Q			V
17+50	0.8856	0.14	Q			V
17+55	0.8864	0.13	Q			V
18+ 0	0.8873	0.13	Q			V
18+ 5	0.8882	0.12	Q			V
18+10	0.8890	0.12	Q			V
18+15	0.8898	0.12	Q			V
18+20	0.8907	0.12	Q			V
18+25	0.8915	0.12	Q			V
18+30	0.8924	0.12	Q			V
18+35	0.8931	0.11	Q			V
18+40	0.8938	0.10	Q			V
18+45	0.8945	0.09	Q			V
18+50	0.8950	0.08	Q			V
18+55	0.8955	0.07	Q			V
19+ 0	0.8960	0.06	Q			V
19+ 5	0.8965	0.07	Q			V
19+10	0.8970	0.09	Q			V
19+15	0.8977	0.09	Q			V
19+20	0.8983	0.10	Q			V
19+25	0.8991	0.11	Q			V
19+30	0.8999	0.12	Q			V
19+35	0.9007	0.11	Q			V
19+40	0.9014	0.10	Q			V
19+45	0.9020	0.09	Q			V
19+50	0.9026	0.08	Q			V
19+55	0.9031	0.07	Q			V
20+ 0	0.9035	0.06	Q			V
20+ 5	0.9040	0.07	Q			V
20+10	0.9046	0.09	Q			V
20+15	0.9052	0.09	Q			V
20+20	0.9058	0.09	Q			V
20+25	0.9065	0.09	Q			V
20+30	0.9071	0.09	Q			V
20+35	0.9077	0.09	Q			V
20+40	0.9084	0.09	Q			V
20+45	0.9090	0.09	Q			V
20+50	0.9096	0.08	Q			V
20+55	0.9100	0.07	Q			V
21+ 0	0.9105	0.06	Q			V
21+ 5	0.9110	0.07	Q			V
21+10	0.9115	0.09	Q			V
21+15	0.9122	0.09	Q			V
21+20	0.9127	0.08	Q			V
21+25	0.9132	0.07	Q			V
21+30	0.9136	0.06	Q			V
21+35	0.9141	0.07	Q			V
21+40	0.9147	0.09	Q			V
21+45	0.9153	0.09	Q			V
21+50	0.9159	0.08	Q			V
21+55	0.9163	0.07	Q			V
22+ 0	0.9168	0.06	Q			V
22+ 5	0.9173	0.07	Q			V
22+10	0.9178	0.09	Q			V
22+15	0.9185	0.09	Q			V
22+20	0.9190	0.08	Q			V
22+25	0.9195	0.07	Q			V
22+30	0.9199	0.06	Q			V
22+35	0.9203	0.06	Q			V
22+40	0.9208	0.06	Q			V
22+45	0.9212	0.06	Q			V
22+50	0.9216	0.06	Q			V
22+55	0.9220	0.06	Q			V
23+ 0	0.9225	0.06	Q			V
23+ 5	0.9229	0.06	Q			V
23+10	0.9233	0.06	Q			V
23+15	0.9237	0.06	Q			V
23+20	0.9241	0.06	Q			V
23+25	0.9246	0.06	Q			V
23+30	0.9250	0.06	Q			V
23+35	0.9254	0.06	Q			V
23+40	0.9258	0.06	Q			V
23+45	0.9262	0.06	Q			V
23+50	0.9267	0.06	Q			V
23+55	0.9271	0.06	Q			V
24+ 0	0.9275	0.06	Q			V
24+ 5	0.9278	0.04	Q			V
24+10	0.9279	0.01	Q			V
24+15	0.9279	0.01	Q			V
24+20	0.9279	0.00	Q			V
24+25	0.9280	0.00	Q			V

Detention Basin Stage-Storage Calculations (Basin A11, A12, & H)

Basin A11 Stage /Storage

Elev	Diff (Ft)	Stage (Ft)	Area (SF)	Average Area (SF)	Incrimental Volume (CF)	Total Volume (CF)	Total Volume (Ac-ft)	
1600.00	0	0	4384.2	0.0	0.0	0	0	
1601.00	1.00	1.00	5450.1	4917.2	4917.2	4917.15	0.113	
1602.00	1.00	2.00	6592.0	6021.1	6021.1	10938.20	0.251	Storage @ 2.5' = 0.33 AC-FT
1603.00	1.00	3.00	7810.1	7201.1	7201.1	18139.25	0.416	1' Freeboard
1604.00	1.00	4.00	9944.2	8877.2	8877.2	27016.40	0.620	
1605.00	1.00	5.00	10142.1	10043.2	10043.2	37059.55	0.851	

Basin A12 Stage /Storage

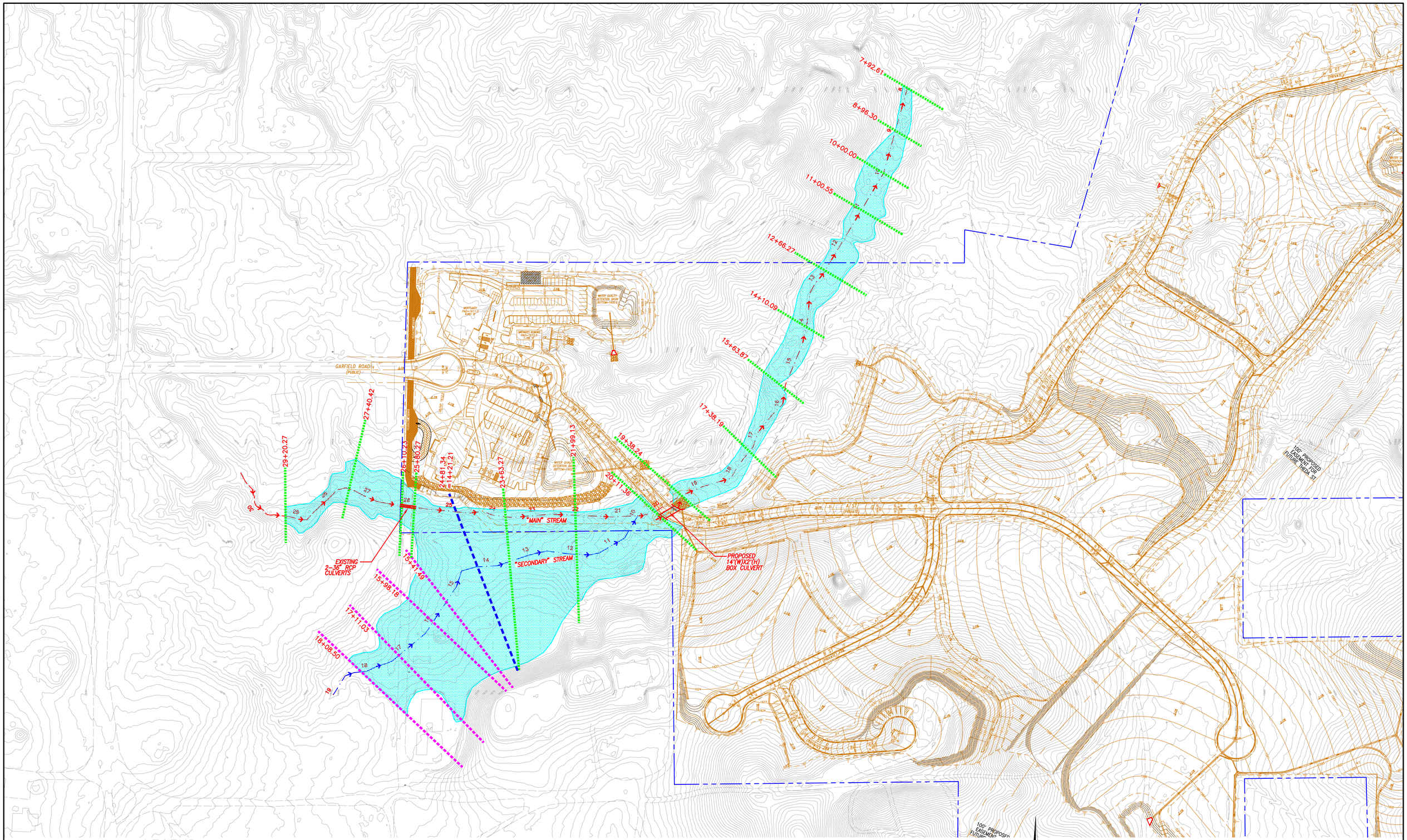
Elev	Diff (Ft)	Stage (Ft)	Area (SF)	Average Area (SF)	Incrimental Volume (CF)	Total Volume (CF)	Total Volume (Ac-ft)	
1602.00	0	0	4928.1	0.0	0.0	0	0	
1603.00	1.00	1.00	6146.9	5537.5	5537.5	5537.50	0.127	
1604.00	1.00	2.00	7453.5	6800.2	6800.2	12337.70	0.283	
1605.00	1.00	3.00	8847.7	8150.6	8150.6	20488.30	0.470	Storage @ 3.0' = 0.47 AC-FT
1606.00	1.00	4.00	10329.7	9588.7	9588.7	30077.00	0.690	1' Freeboard
1607.00	1.00	5.00	11656.6	10993.2	10993.2	41070.15	0.943	

Basin H Stage /Storage

Elev	Diff (Ft)	Stage (Ft)	Area (SF)	Average Area (SF)	Incrimental Volume (CF)	Total Volume (CF)	Total Volume (Ac-ft)	
1551.00	0	0	1625.0	0.0	0.0	0	0	
1552.00	1.00	1.00	2482.0	2053.5	2053.5	2053.50	0.047	
1553.00	1.00	2.00	3383.0	2932.5	2932.5	4986.00	0.114	
1554.00	1.00	3.00	4389.0	3886.0	3886.0	8872.00	0.204	
1555.00	1.00	4.00	6696.0	5542.5	5542.5	14414.50	0.331	Storage @ 4' = 0.33 AC-FT
1556.00	1.00	5.00	8727.0	7711.5	7711.5	22126.00	0.508	1' Freeboard

SECTION 5
HEC-RAS ANALYSIS

FLOODPLAIN EXHIBIT



LEGEND

- HEC-RAS CROSS SECTION (MAIN MODEL)
- HEC-RAS CROSS SECTION (SECONDARY MODEL)
- HEC-RAS CROSS SECTION (MAIN & SECONDARY MODEL)
- MAIN CHANNEL (MAIN MODEL) THALWEG
- SECONDARY CHANNEL (SECONDARY MODEL) THALWEG
- PROPERTY BOUNDARY
- 100-YEAR FLOOD PLAIN

FEET
0 40 80 160
0 1/2 2
INCHES

REVISION	
DATE	DESCRIPTION

APPLICANT:
CLIENT NAME
CLIENT ADDRESS
CITY, STATE ZIP
PH: (000) 000-0000

PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ■ ENGINEERING ■ SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

CRESCENT GARDENS, CITY OF LAKE ELSINORE

HEC-RAS ANALYIS
100-YEAR FLOOD PLAIN

DESIGNED BY:
DRAFTED BY: SM
CHECKED BY: MR
DATE: 05/19/2022
SHEET 1

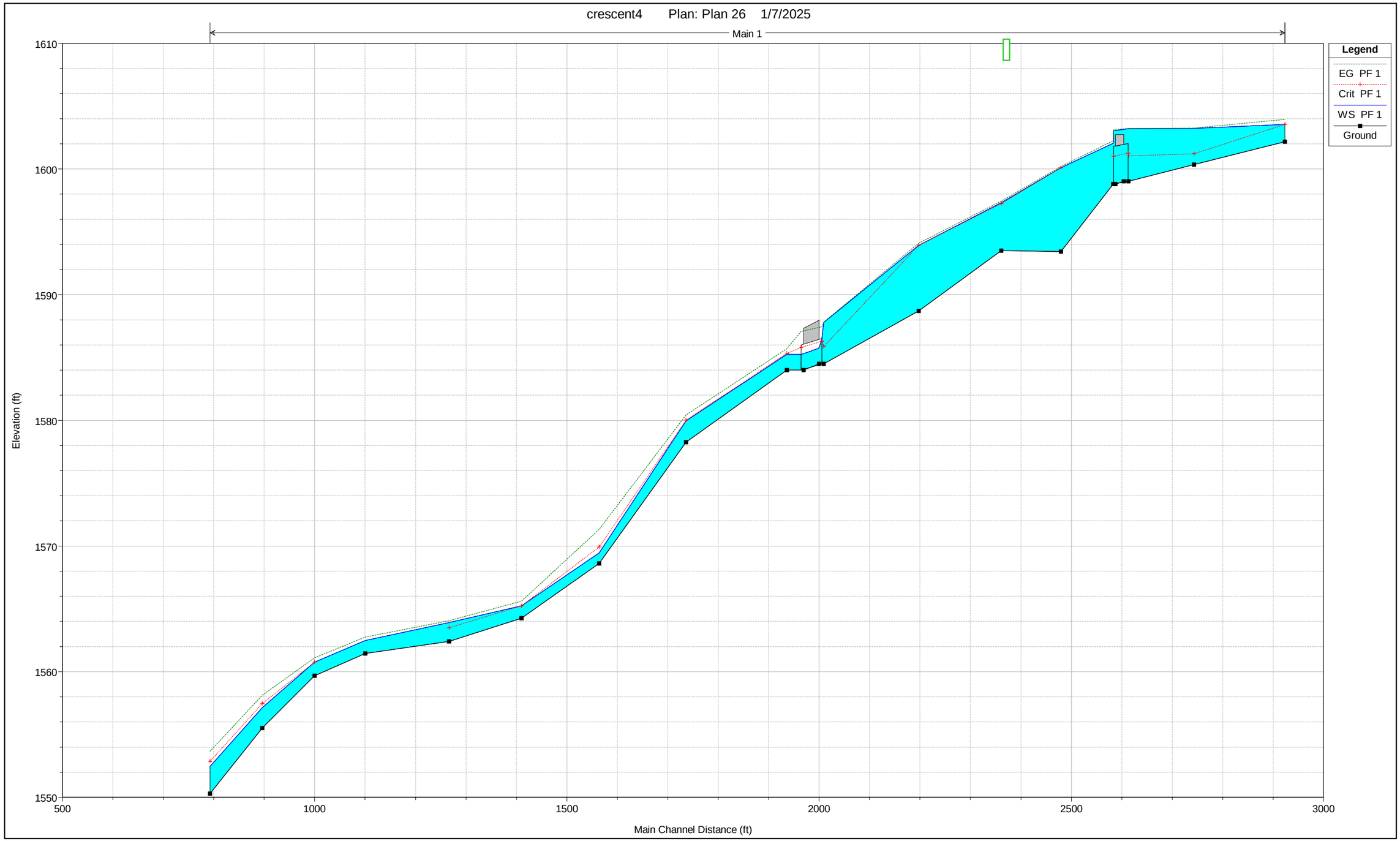
W.O.: 4427-1

DATE: Jan. 07, 2025 10:29:25 AM FILE: \\ASHUR\Projects\1167\Engineering\SY_Hydrology\HEC-RAS\Crescent Gardens Hec-Ras Exhibit-R3-2025-0102.dwg

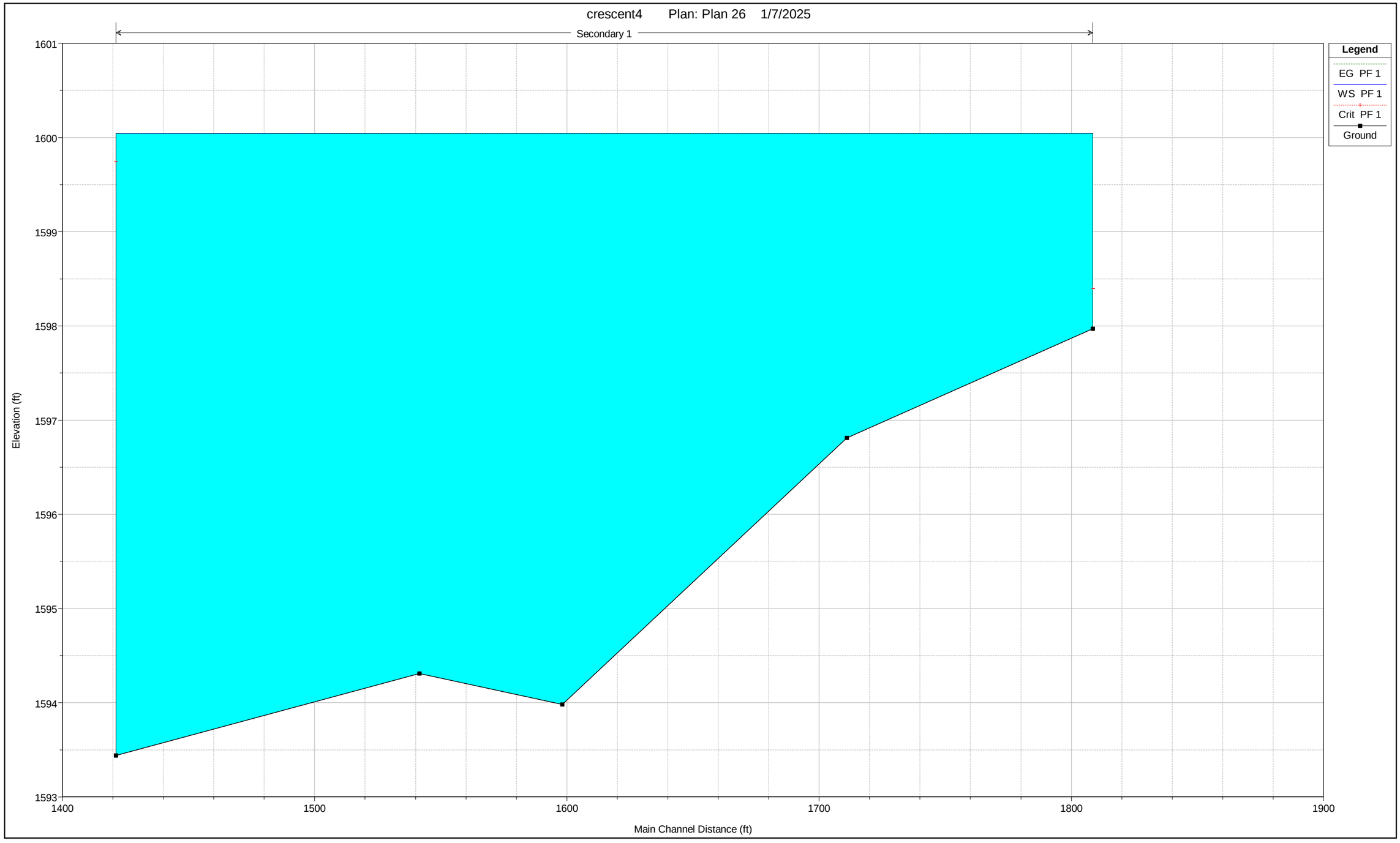
WATER SURFACE PROFILE AND PROFILE SUMMARY TABLE

100-YEAR FLOW

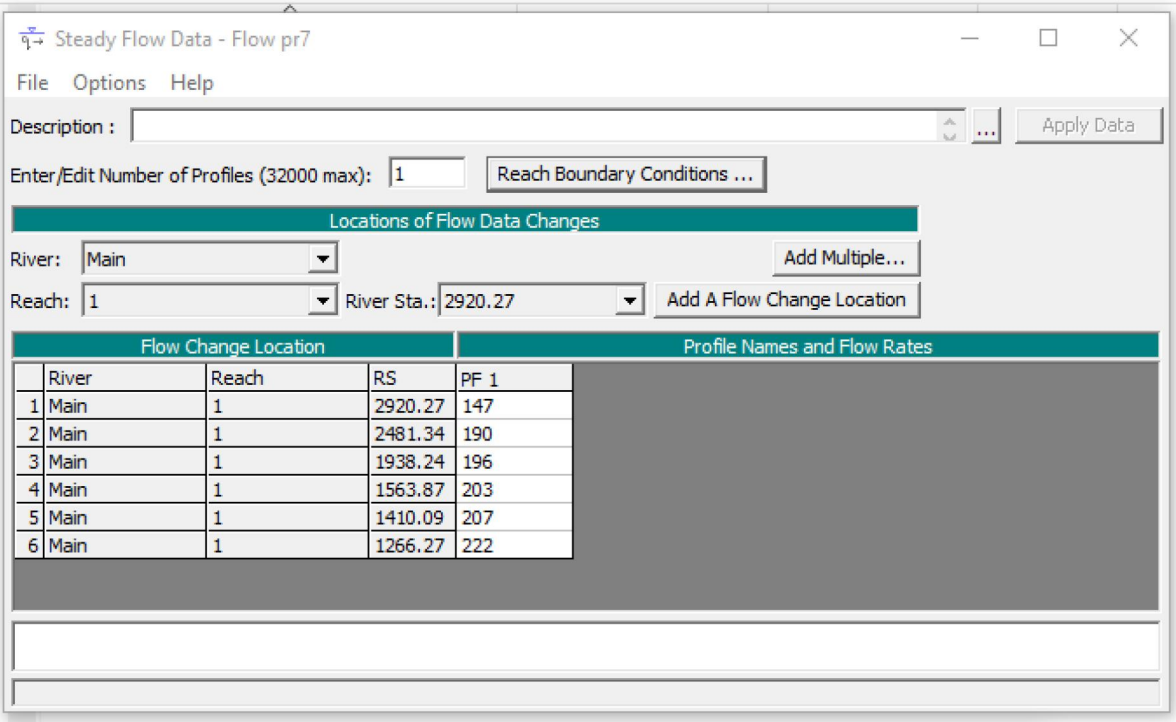
100-year Profile - Main Model

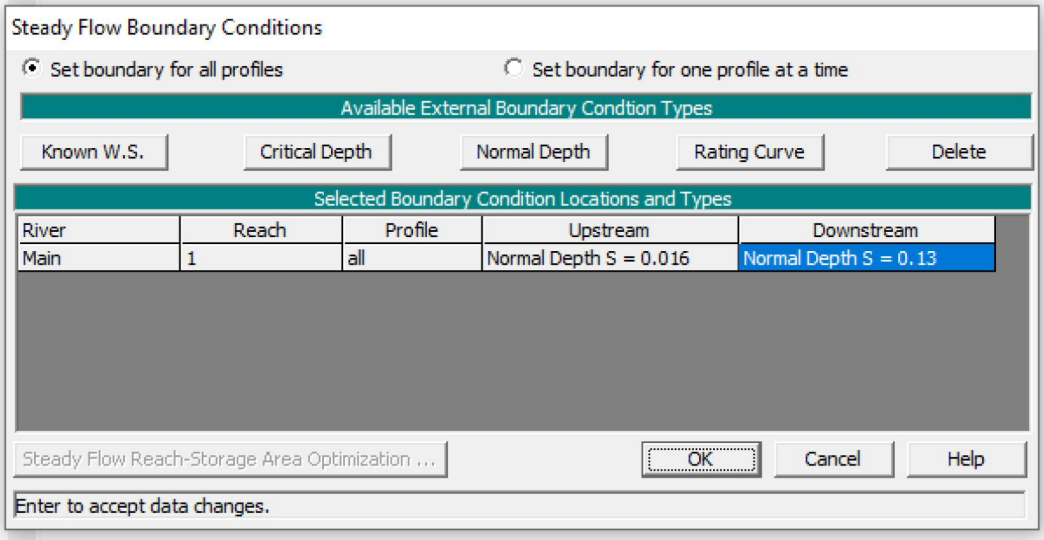


100-year Profile - Secondary Model



Steady Flow Data & Reach Boundary Conditions 100-year Main Model





100-year Profile - Main Model

HEC-RAS Plan: Plan 26 River: Main Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2920.27	PF 1	147.00	1602.17	1603.55	1603.55	1603.94	0.020161	5.02	29.26	38.31	1.01
1	2740.42	PF 1	147.00	1600.34	1603.24	1601.21	1603.25	0.000102	0.69	214.48	106.02	0.08
1	2610.23	PF 1	147.00	1599.02	1603.22	1601.05	1603.23	0.000200	0.87	169.77	96.91	0.12
1	2609.73		Culvert									
1	2580.27	PF 1	147.00	1598.79	1602.05		1602.24	0.011406	3.49	42.14	59.00	0.73
1	2481.34	PF 1	190.00	1593.44	1600.10	1600.10	1600.20	0.033215	2.54	74.90	398.28	1.03
1	2363.27	PF 1	190.00	1593.51	1597.33	1597.25	1597.44	0.014572	2.65	71.69	192.37	0.77
1	2199.13	PF 1	190.00	1588.70	1593.93	1593.93	1594.09	0.030470	3.20	59.45	209.08	1.06
1	2011.36	PF 1	190.00	1584.50	1587.79	1585.87	1587.81	0.000245	0.93	204.29	122.81	0.13
1	1981.43		Culvert									
1	1938.24	PF 1	196.00	1584.00	1585.25	1585.32	1585.70	0.030549	5.40	35.18	53.26	1.17
1	1738.19	PF 1	196.00	1578.26	1579.96	1580.01	1580.44	0.023126	5.57	35.16	43.67	1.10
1	1563.87	PF 1	203.00	1568.62	1569.46	1569.92	1571.32	0.196619	10.94	18.56	41.84	2.90
1	1410.09	PF 1	207.00	1564.26	1565.25	1565.25	1565.62	0.020433	4.85	42.65	59.54	1.01
1	1266.27	PF 1	222.00	1562.42	1563.90	1563.49	1564.06	0.005043	3.19	69.60	63.82	0.54
1	1100.55	PF 1	222.00	1561.45	1562.48		1562.76	0.013347	4.25	52.27	64.73	0.83
1	1000	PF 1	222.00	1559.68	1560.75	1560.75	1561.10	0.020909	4.71	47.15	70.09	1.01
1	896.30	PF 1	222.00	1555.52	1557.15	1557.47	1558.12	0.039446	7.90	28.09	30.73	1.46
1	792.61	PF 1	222.00	1550.29	1552.45	1552.85	1553.66	0.046404	8.81	25.19	26.15	1.58

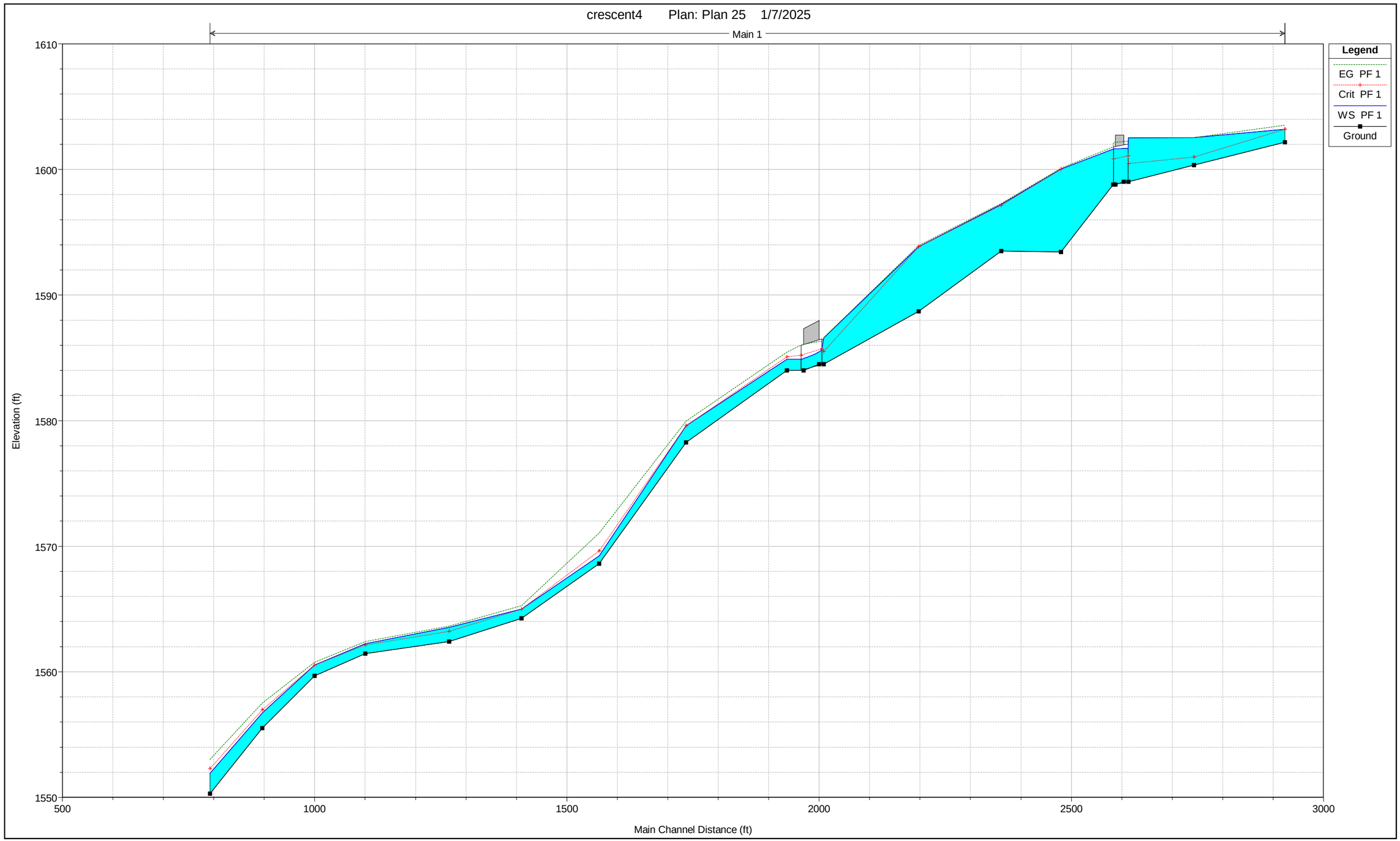
100-year Profile - Secondary Model

HEC-RAS Plan: Plan 26 River: Secondary Reach: 1 Profile: PF 1

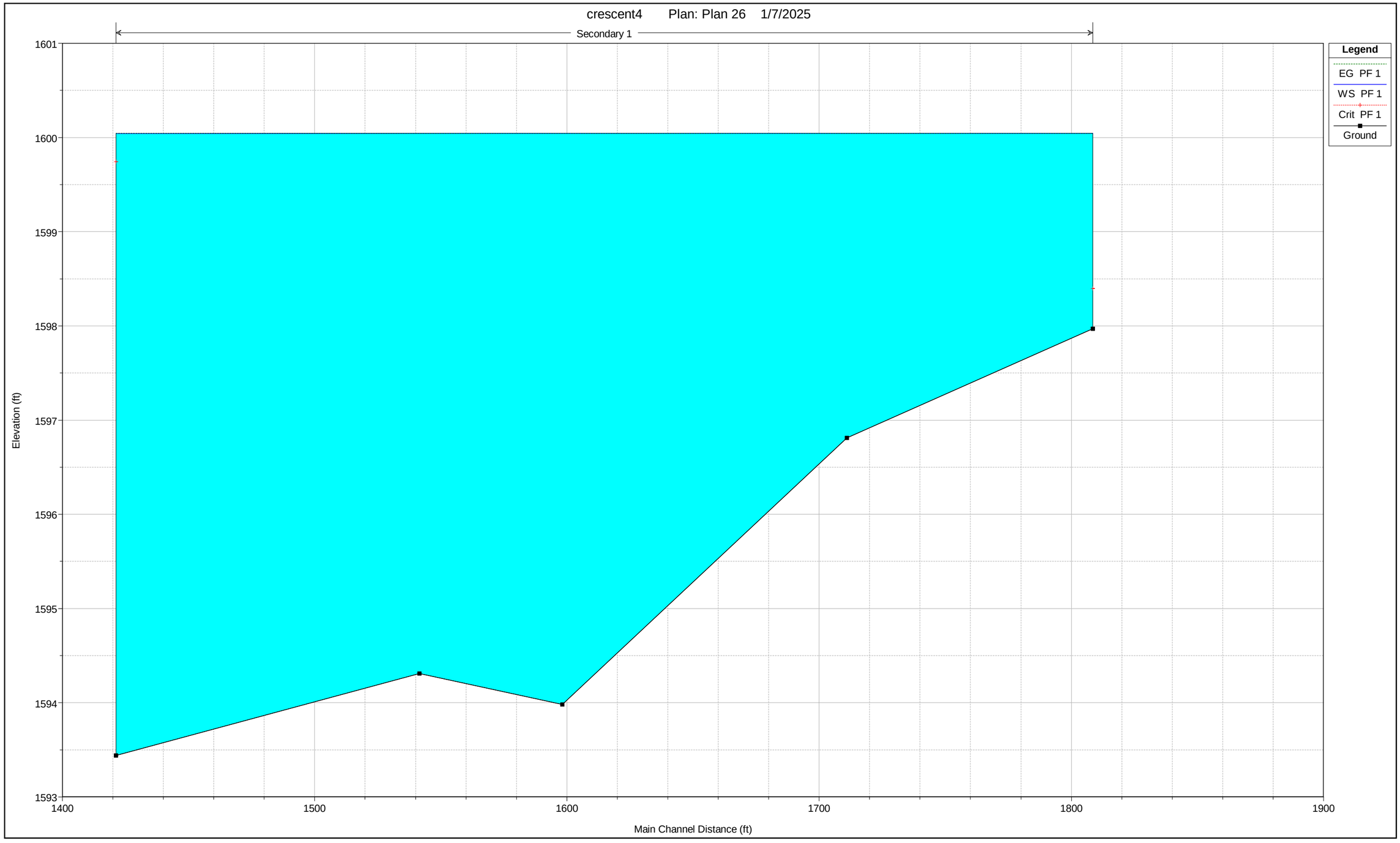
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1808.50	PF 1	47.00	1597.97	1600.11	1598.51	1600.11	0.000028	0.23	200.71	188.35	0.04
1	1711.03	PF 1	47.00	1596.81	1600.11		1600.11	0.000004	0.13	357.28	206.66	0.02
1	1598.18	PF 1	47.00	1593.98	1600.11		1600.11	0.000000	0.06	805.65	262.88	0.01
1	1541.49	PF 1	47.00	1594.31	1600.11		1600.11	0.000000	0.06	838.47	304.01	0.01
1	1421.21	PF 1	47.00	1593.44	1600.10	1600.00	1600.11	0.002113	0.63	74.03	398.25	0.26

10-YEAR FLOW

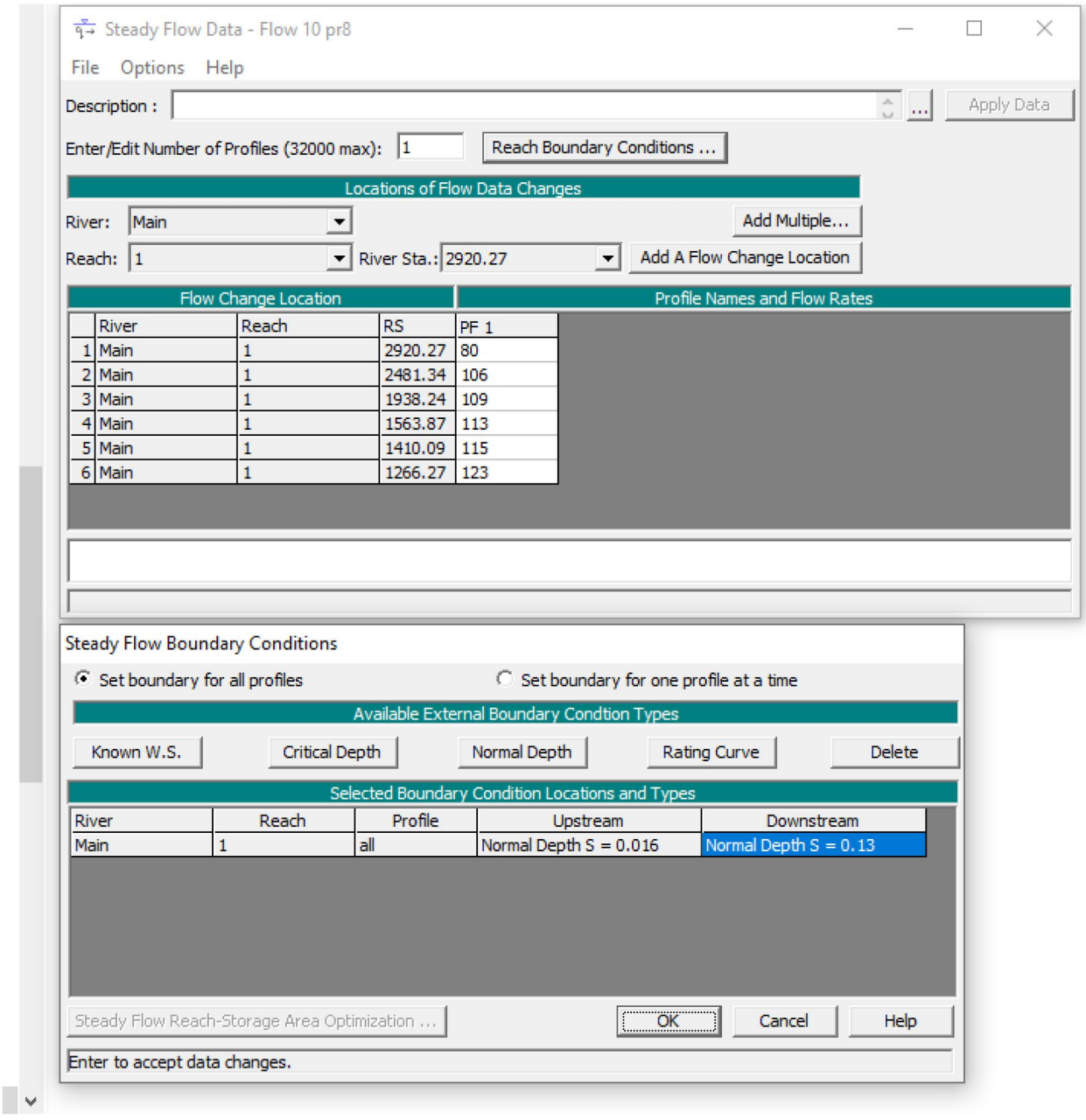
10-year Profile - Main Model



100-year Profile - Secondary Model



Steady Flow Data & Reach Boundary Conditions 10-year



10-year Profile - Main Model

HEC-RAS Plan: Plan 25 River: Main Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2920.27	PF 1	80.00	1602.17	1603.21	1603.21	1603.52	0.021794	4.53	17.67	28.69	1.02
1	2740.42	PF 1	80.00	1600.34	1602.55	1600.98	1602.55	0.000108	0.56	142.88	99.81	0.08
1	2610.23	PF 1	80.00	1599.02	1602.52	1600.47	1602.53	0.000207	0.74	108.02	79.81	0.11
1	2609.73		Culvert									
1	2580.27	PF 1	80.00	1598.79	1601.64		1601.79	0.007004	3.15	25.38	26.97	0.57
1	2481.34	PF 1	106.00	1593.44	1600.04	1600.04	1600.11	0.042263	2.16	49.06	397.58	1.08
1	2363.27	PF 1	106.00	1593.51	1597.22	1597.16	1597.29	0.014299	2.10	50.45	189.13	0.72
1	2199.13	PF 1	106.00	1588.70	1593.85	1593.85	1593.95	0.031209	2.55	41.54	208.45	1.01
1	2011.36	PF 1	106.00	1584.50	1586.59	1585.50	1586.62	0.001338	1.41	75.12	86.37	0.27
1	1981.43		Culvert									
1	1938.24	PF 1	109.00	1584.00	1584.89	1585.09	1585.46	0.060651	6.06	17.49	37.40	1.56
1	1738.19	PF 1	109.00	1578.26	1579.60	1579.60	1579.97	0.020525	4.88	22.35	30.99	1.01
1	1563.87	PF 1	113.00	1568.62	1569.23	1569.63	1571.05	0.257707	10.81	10.46	29.41	3.20
1	1410.09	PF 1	115.00	1564.26	1564.99	1564.99	1565.26	0.022846	4.11	28.01	54.63	1.01
1	1266.27	PF 1	123.00	1562.42	1563.54	1563.21	1563.64	0.004992	2.60	47.29	58.47	0.51
1	1100.55	PF 1	123.00	1561.45	1562.24	1562.14	1562.41	0.012281	3.33	36.95	61.98	0.76
1	1000	PF 1	123.00	1559.68	1560.53	1560.53	1560.76	0.022877	3.90	31.56	66.68	1.00
1	896.30	PF 1	123.00	1555.52	1556.73	1556.97	1557.52	0.040015	7.11	17.29	22.37	1.43
1	792.61	PF 1	123.00	1550.29	1551.92	1552.29	1553.02	0.046493	8.43	14.59	16.13	1.56

100-year Profile - Secondary Model

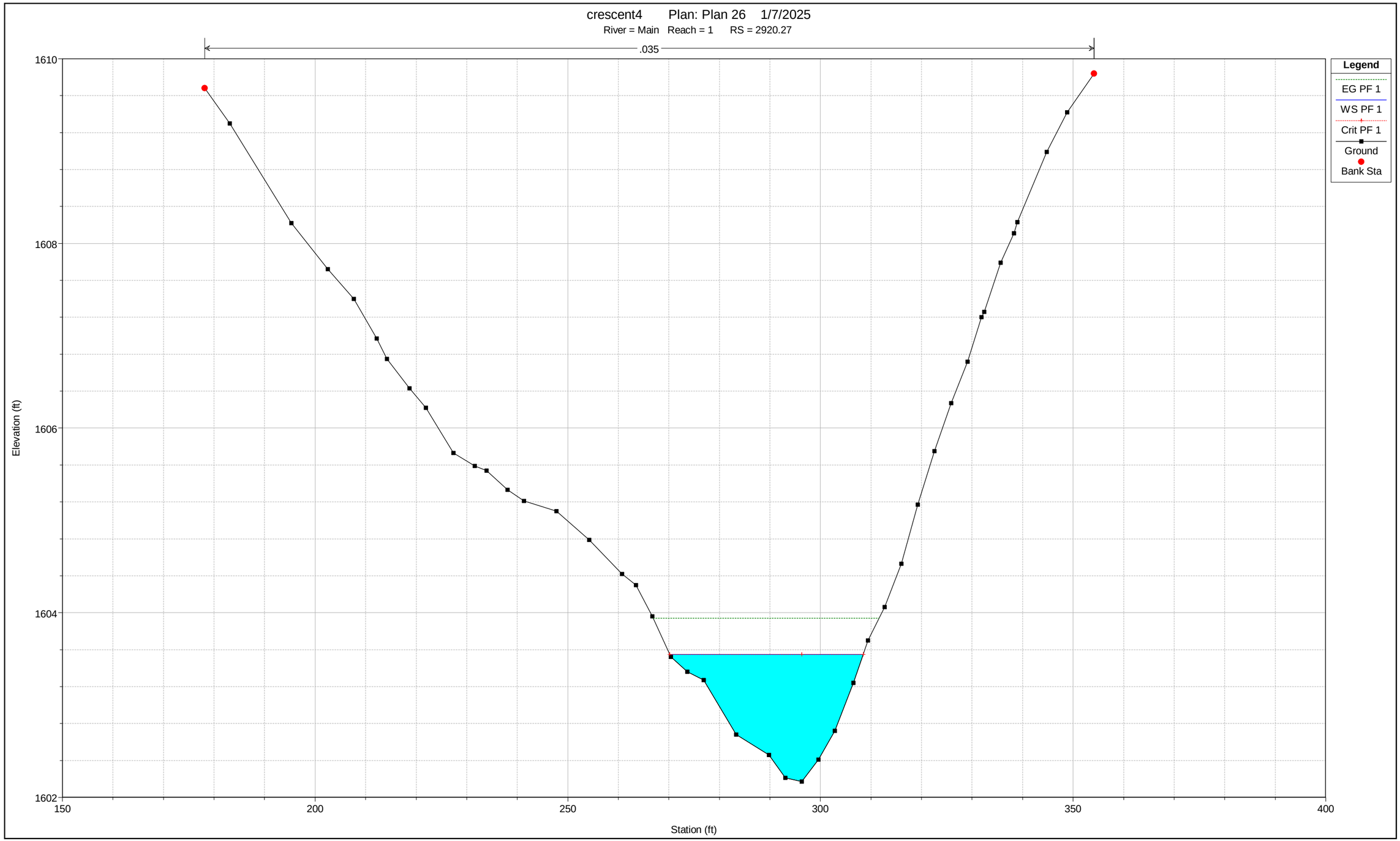
HEC-RAS Plan: Plan 26 River: Secondary Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1808.50	PF 1	47.00	1597.97	1600.11	1598.51	1600.11	0.000028	0.23	200.71	188.35	0.04
1	1711.03	PF 1	47.00	1596.81	1600.11		1600.11	0.000004	0.13	357.28	206.66	0.02
1	1598.18	PF 1	47.00	1593.98	1600.11		1600.11	0.000000	0.06	805.65	262.88	0.01
1	1541.49	PF 1	47.00	1594.31	1600.11		1600.11	0.000000	0.06	838.47	304.01	0.01
1	1421.21	PF 1	47.00	1593.44	1600.10	1600.00	1600.11	0.002113	0.63	74.03	398.25	0.26

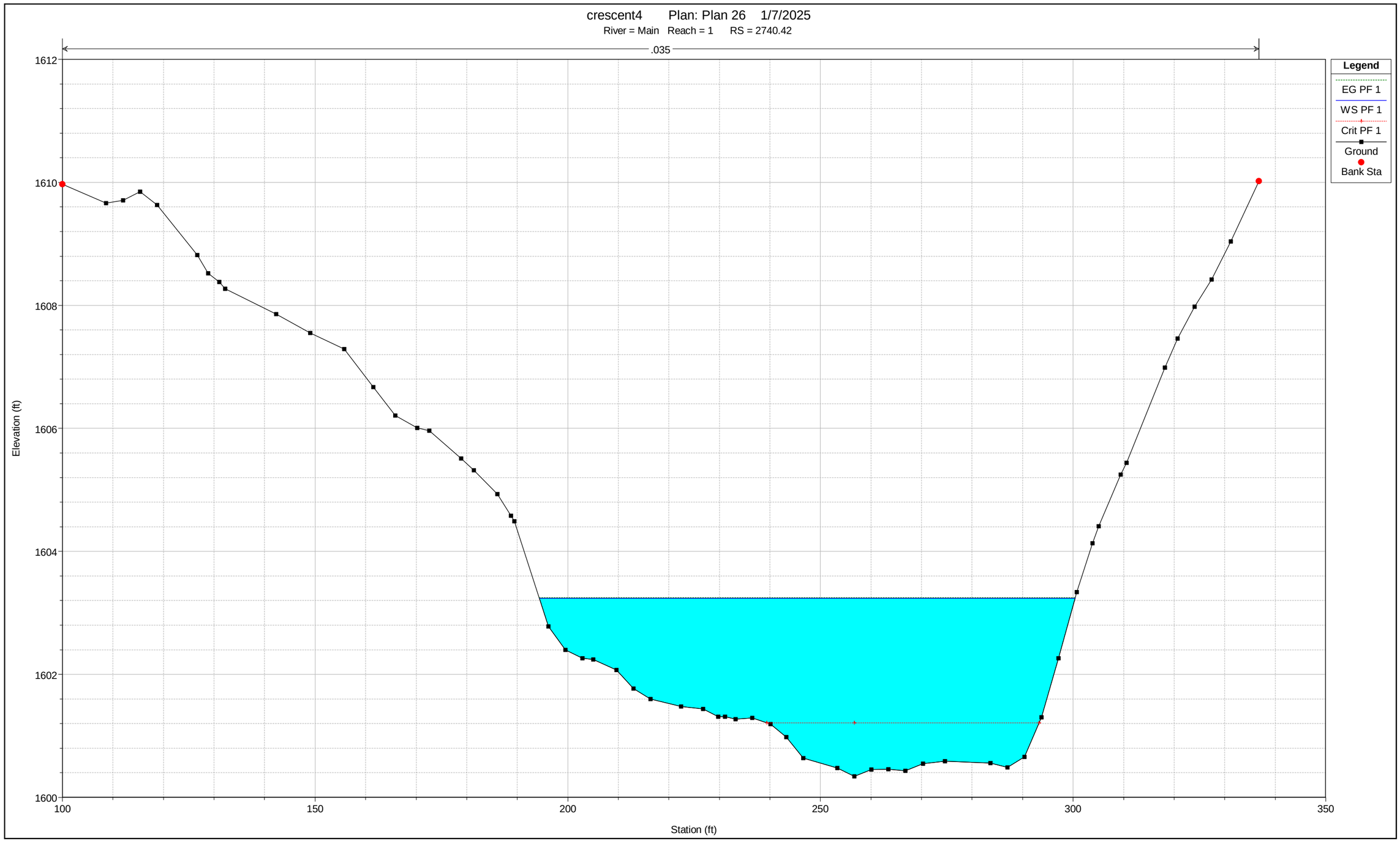
CROSS SECTIONS AND CROSS SECTION SUMMERY TABLE

100-YEAR FLOW

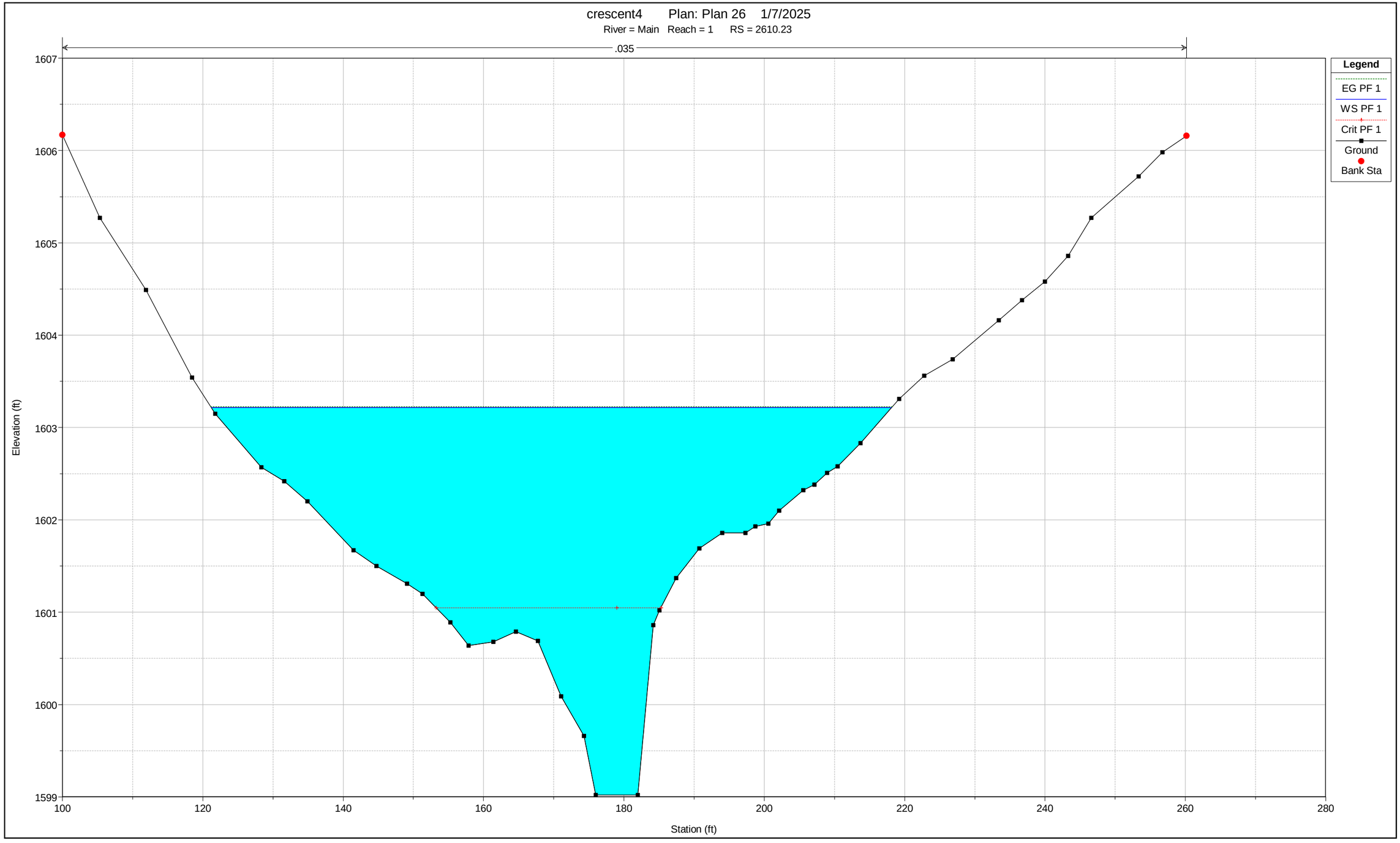
100-year Sections - Main Model



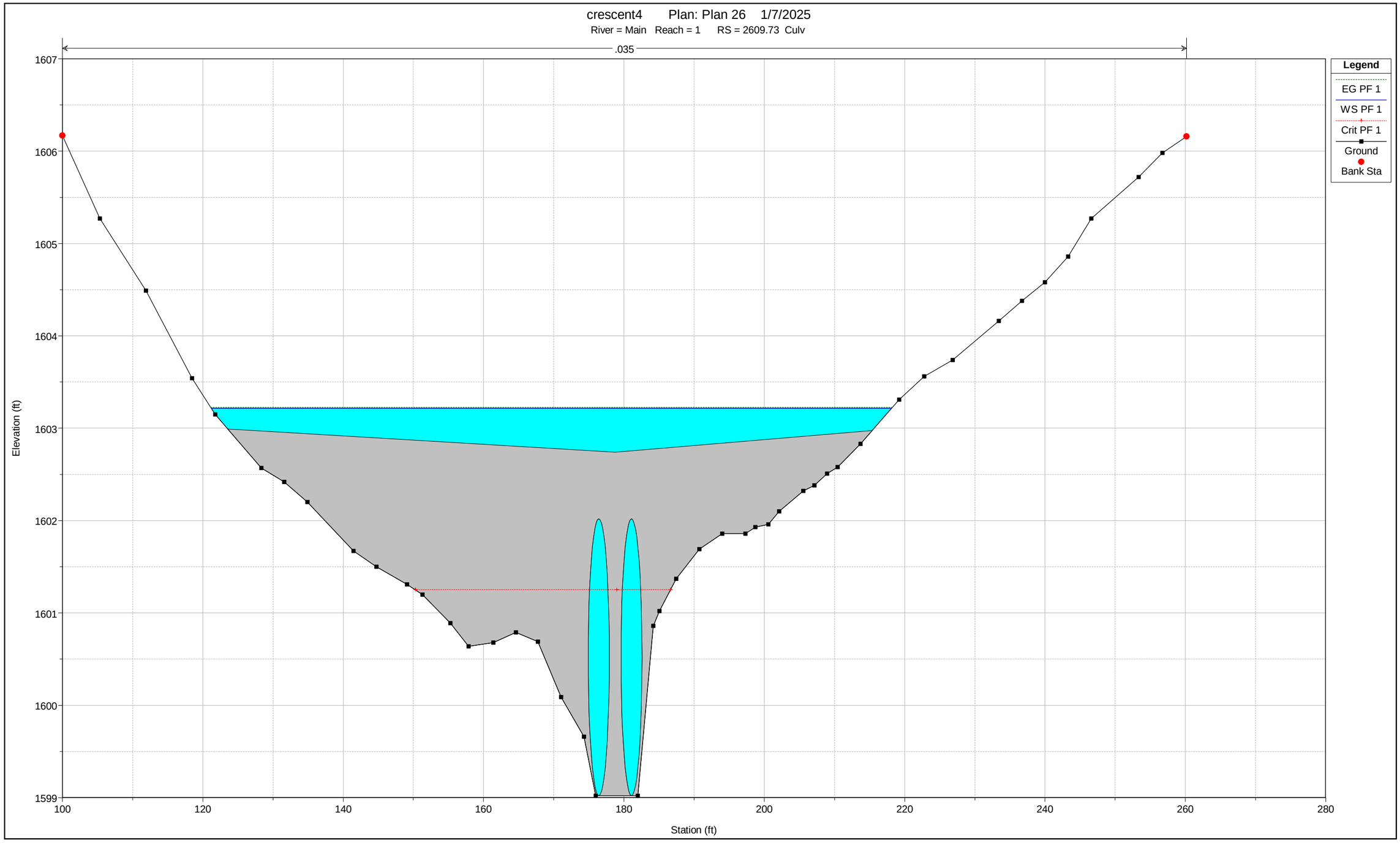
100-year Sections - Main Model



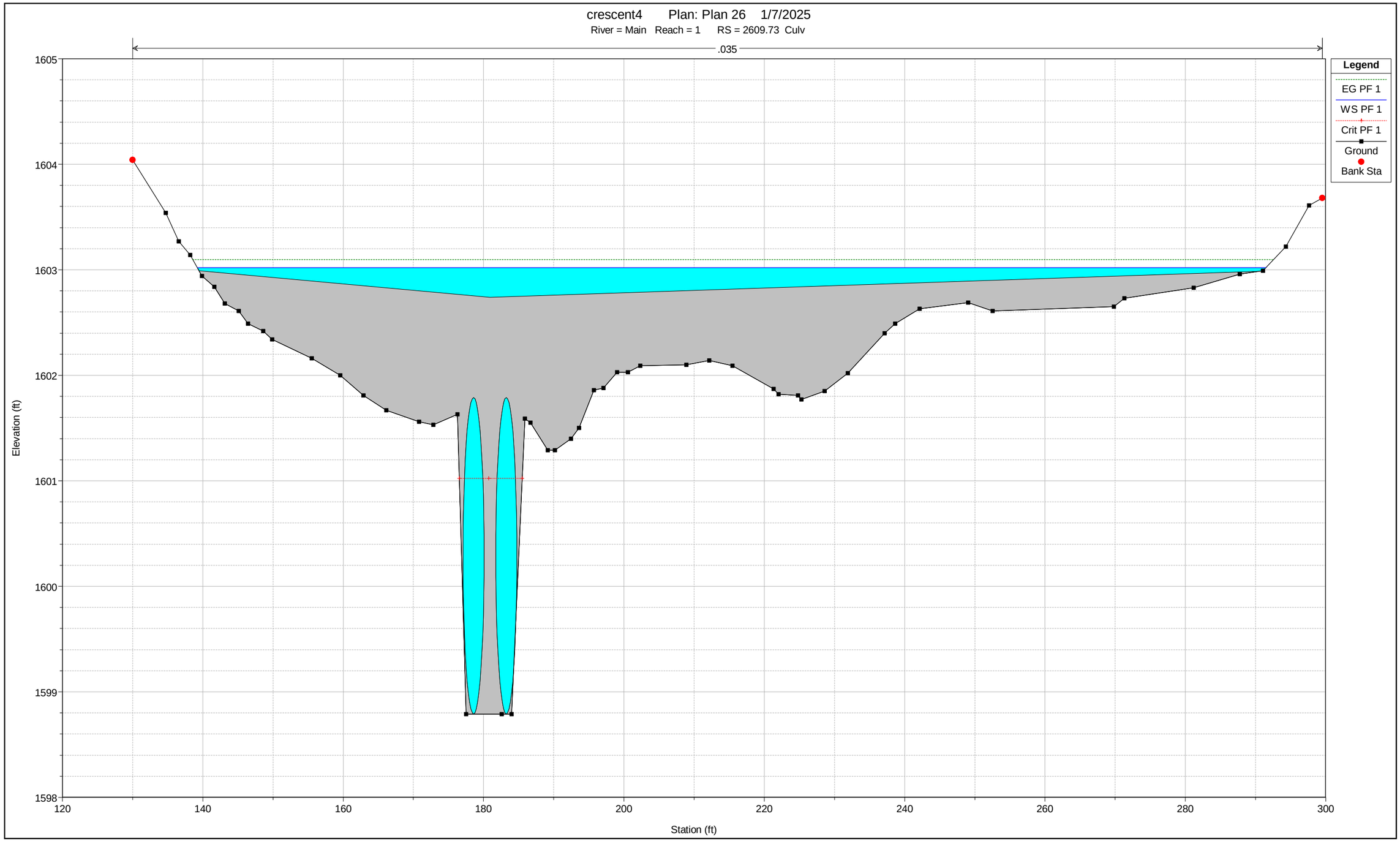
100-year Sections - Main Model



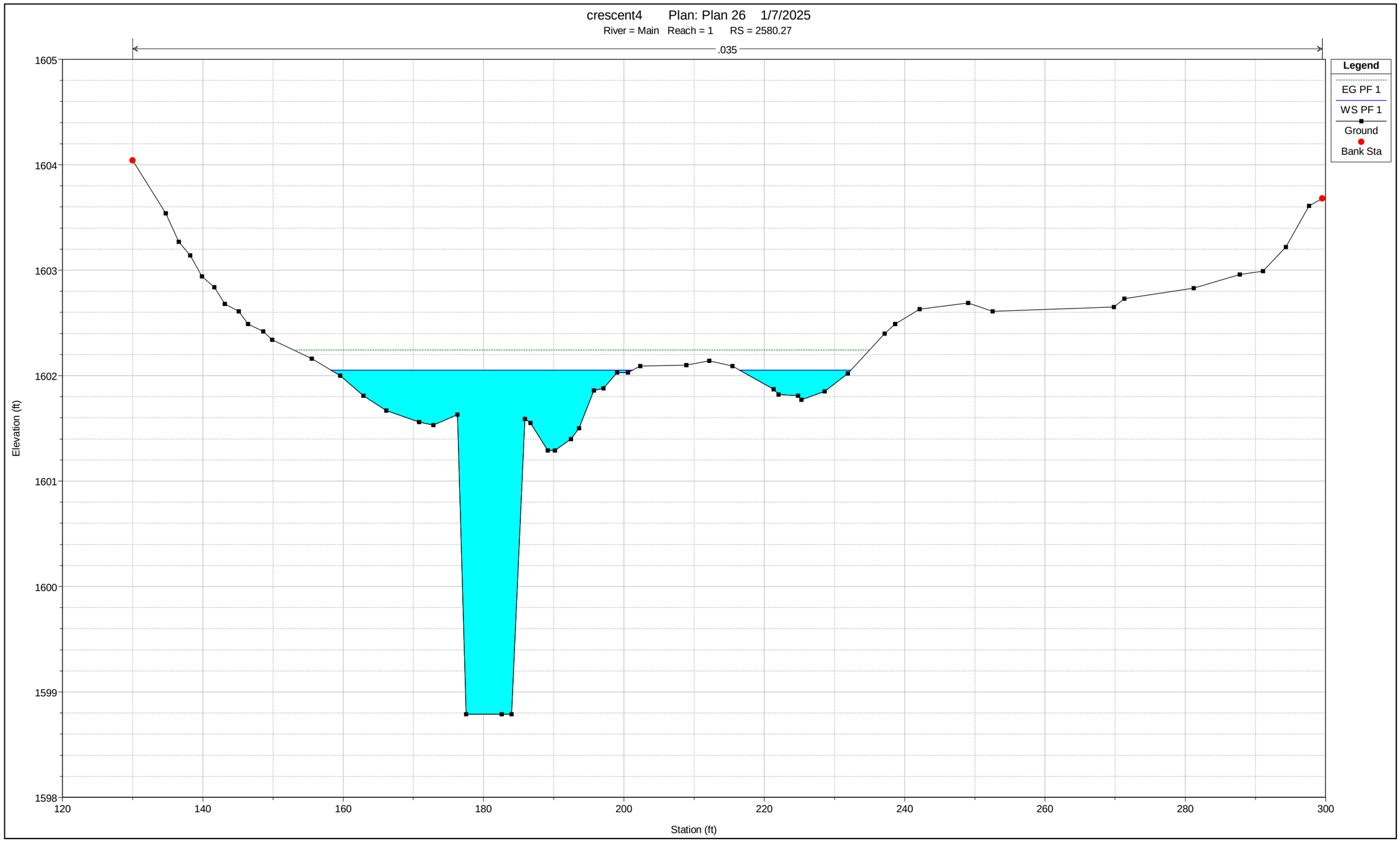
100-year Sections - Main Model



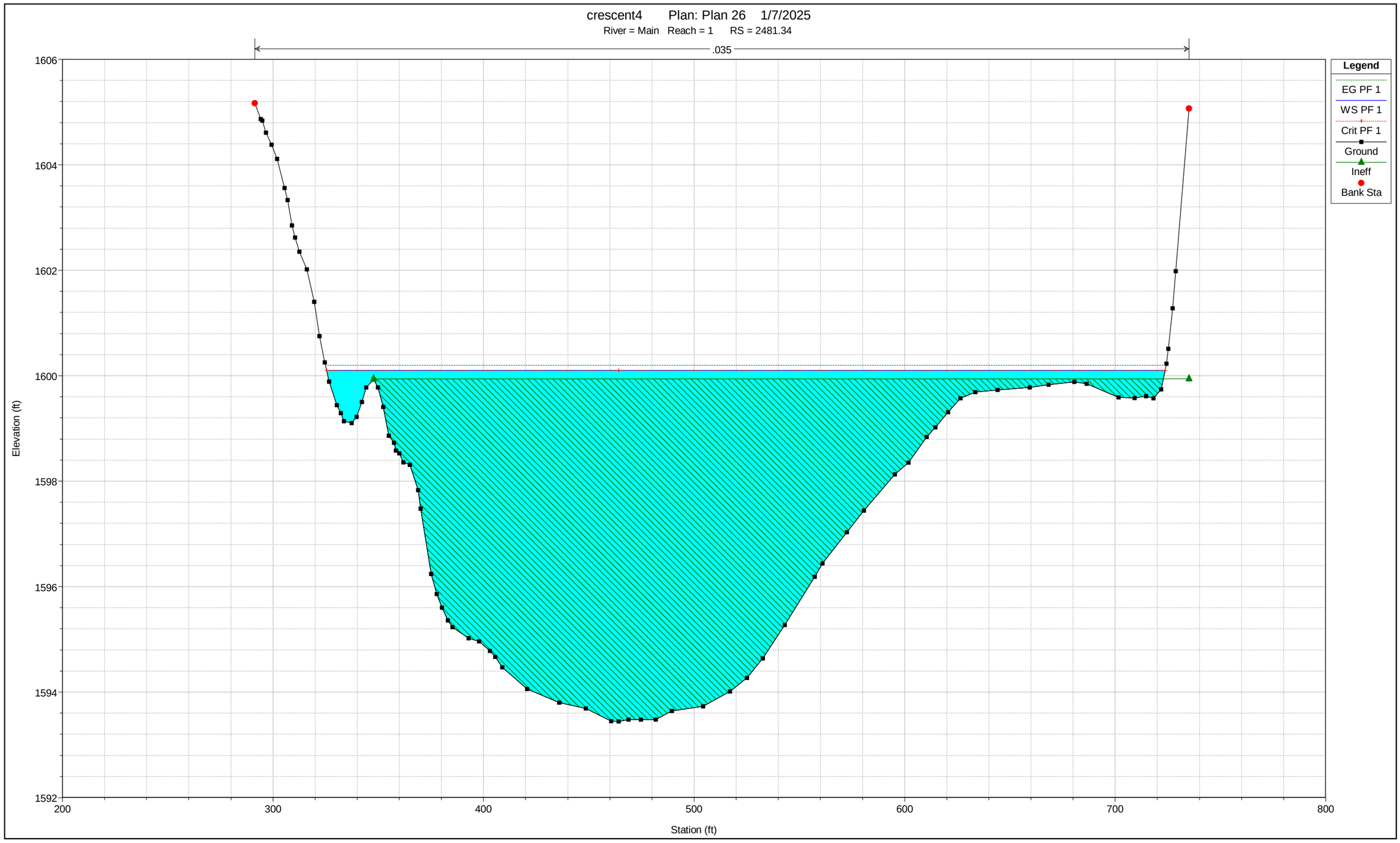
100-year Sections - Main Model



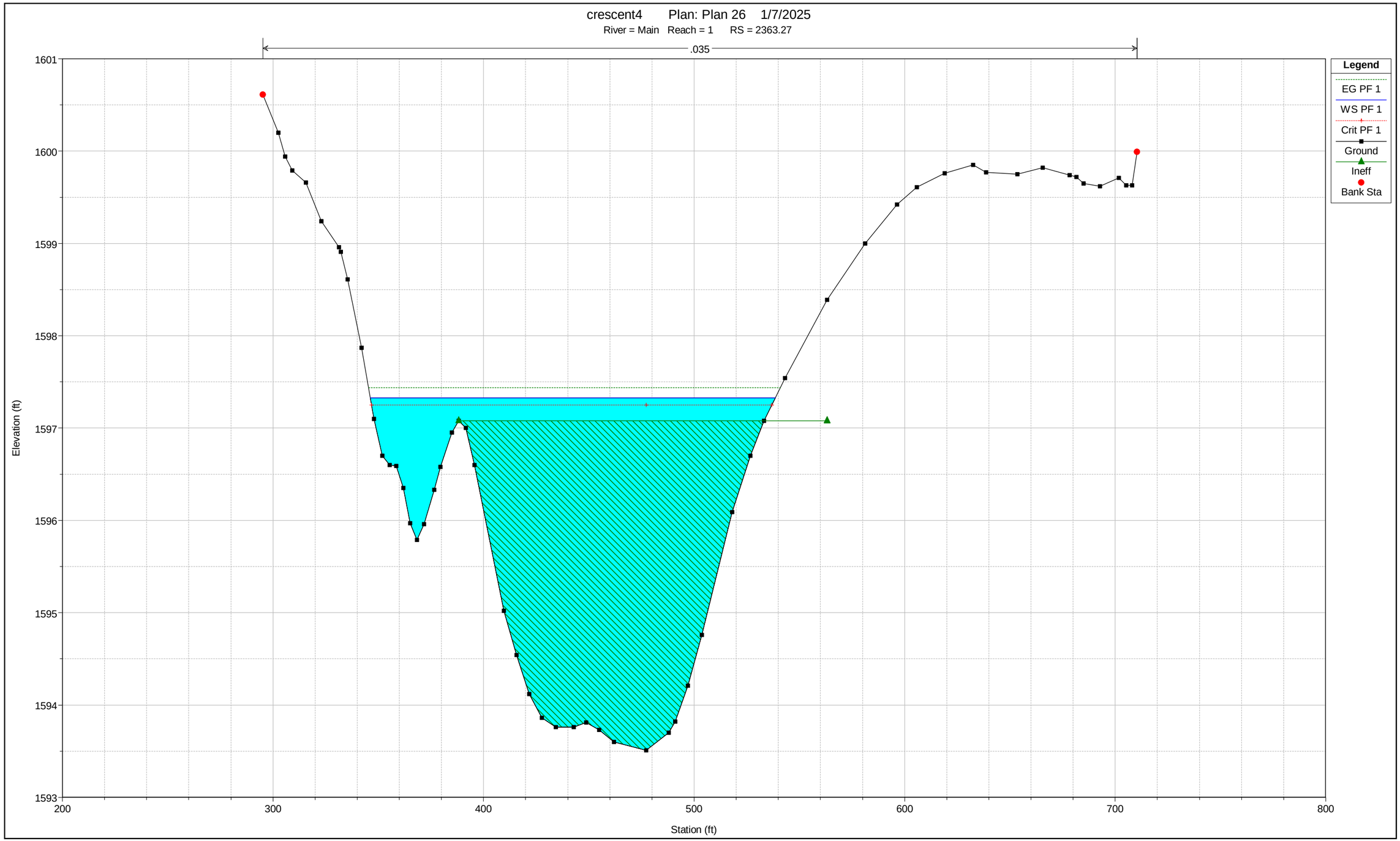
100-year Sections - Main Model



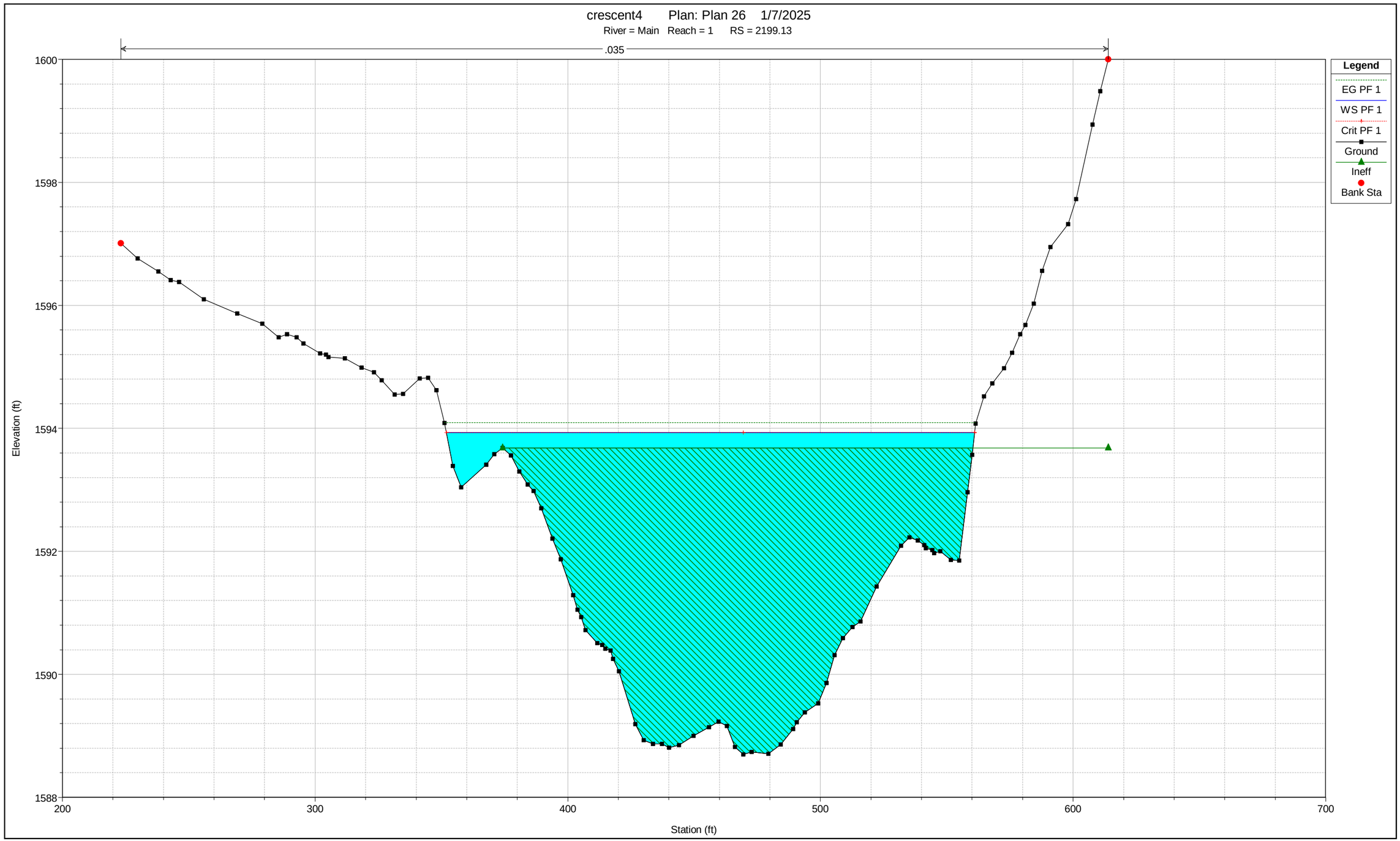
100-year Sections - Main Model



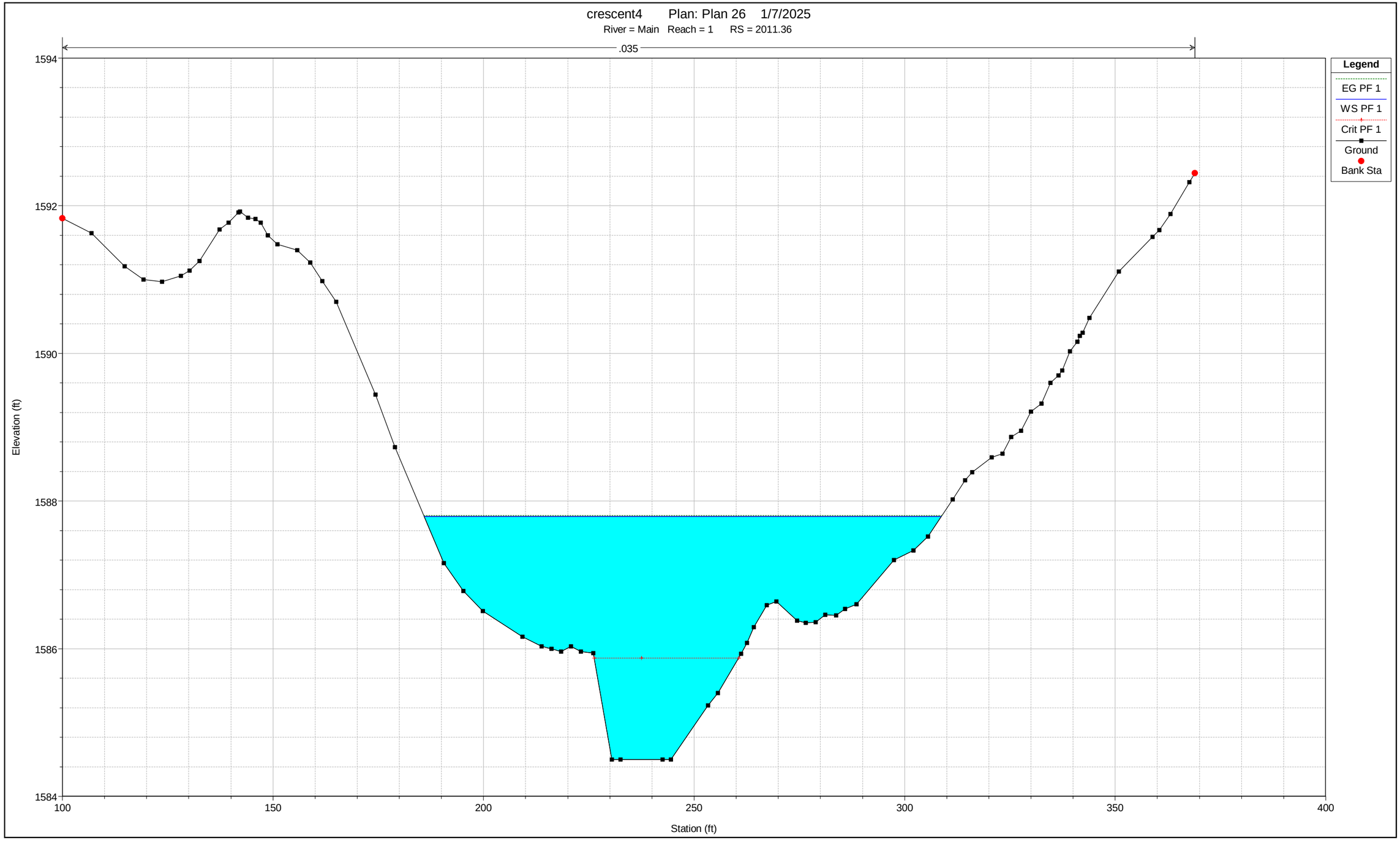
100-year Sections - Main Model



100-year Sections - Main Model



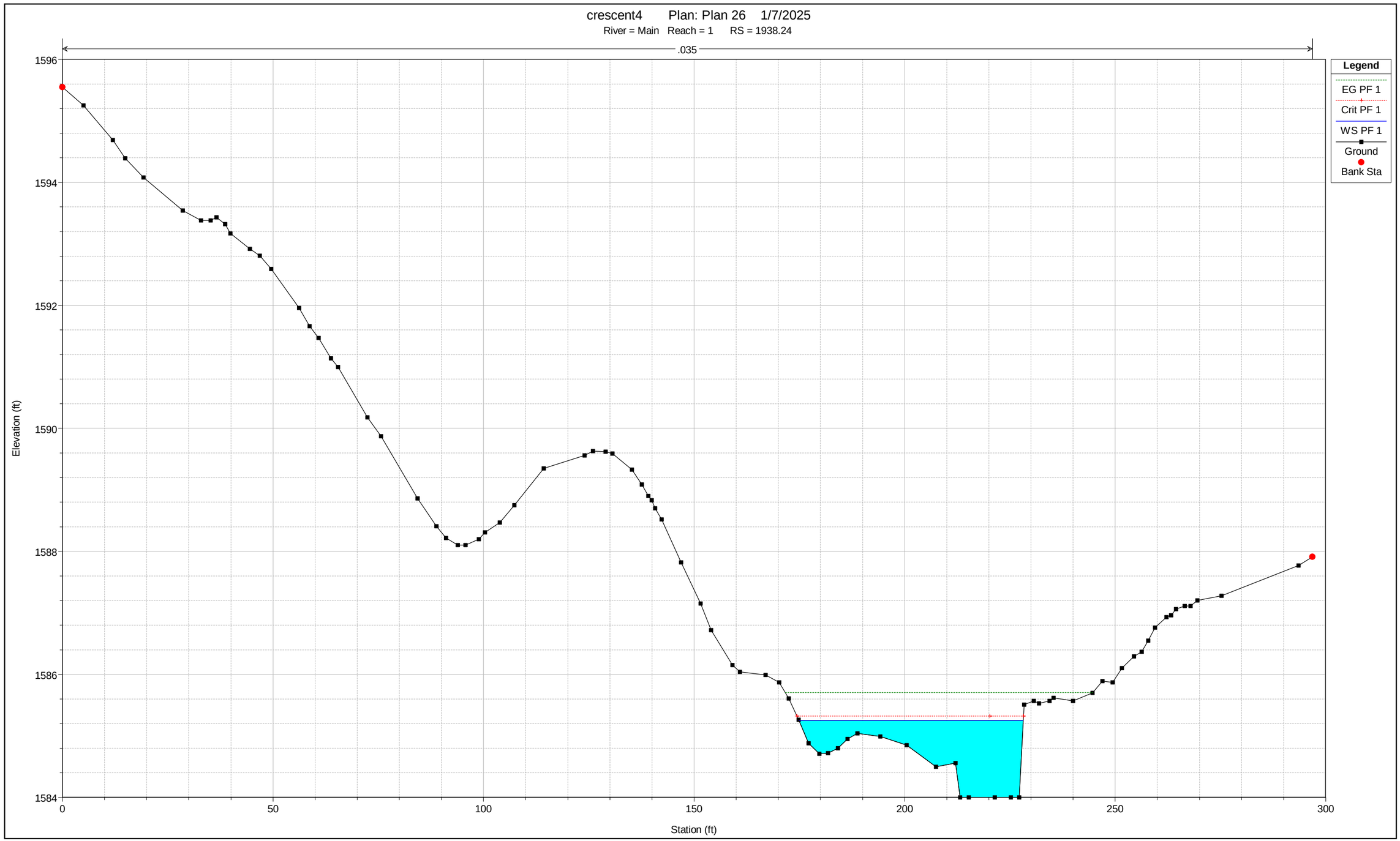
100-year Sections - Main Model



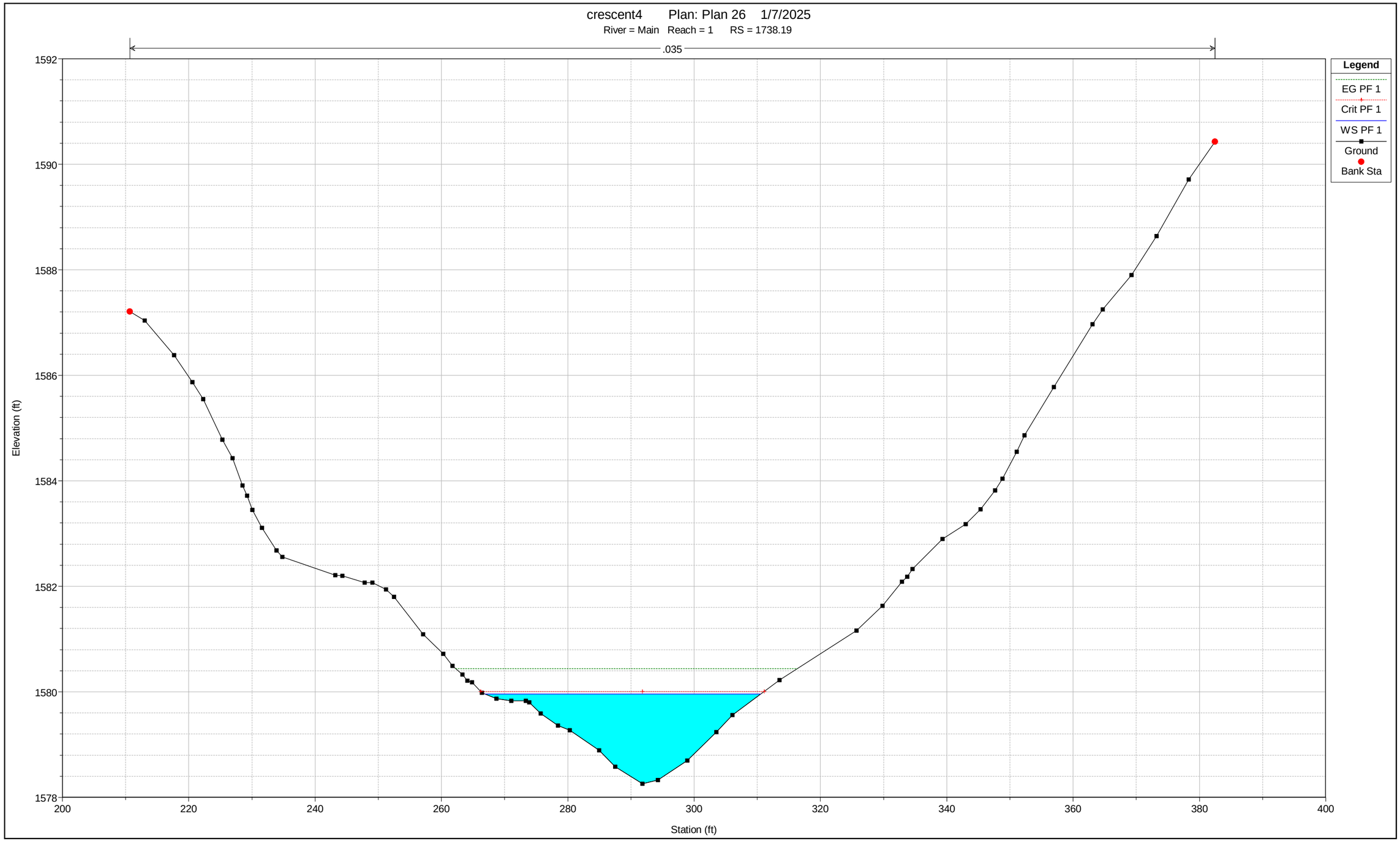
100-year Sections - Main Model



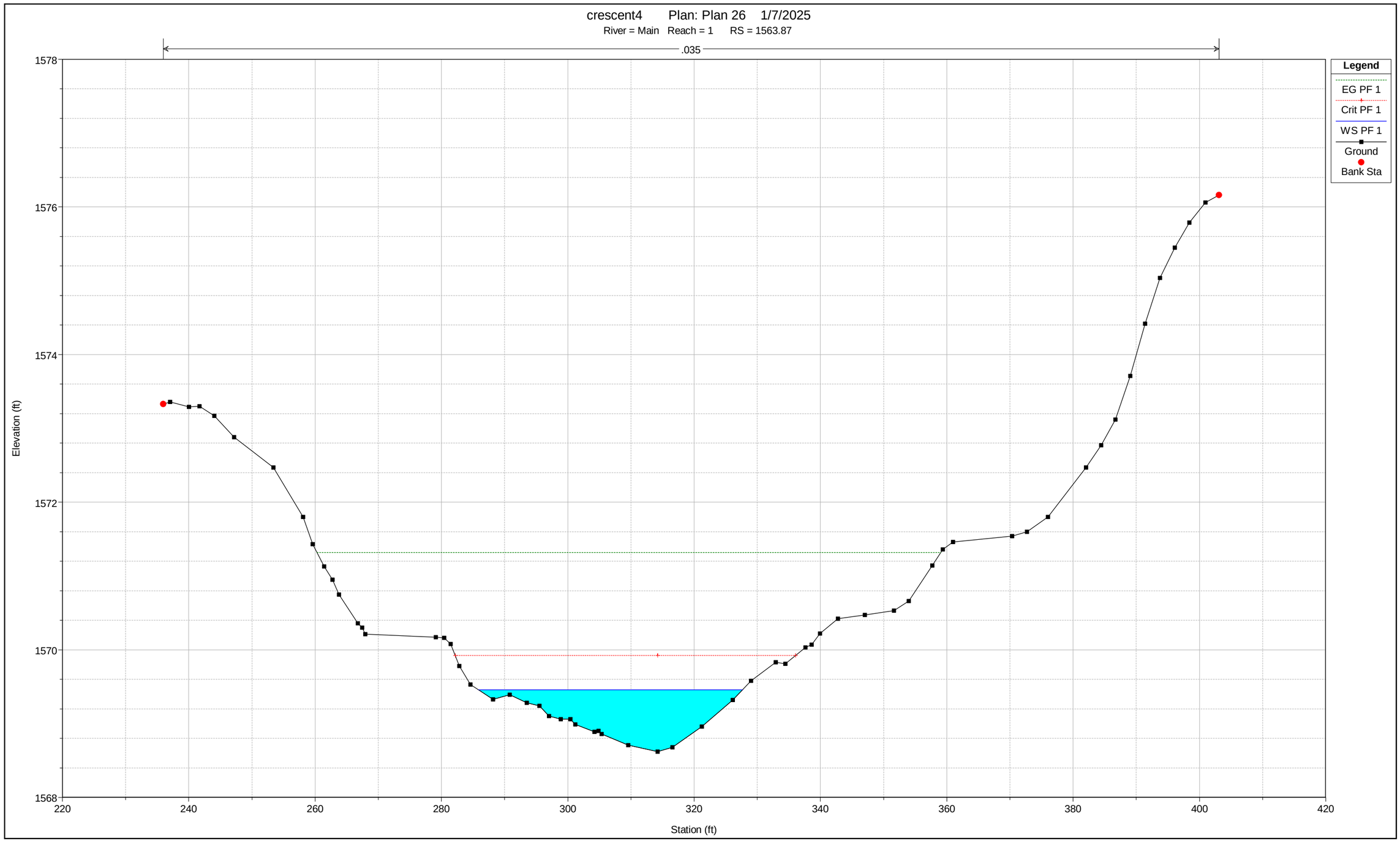
100-year Sections - Main Model



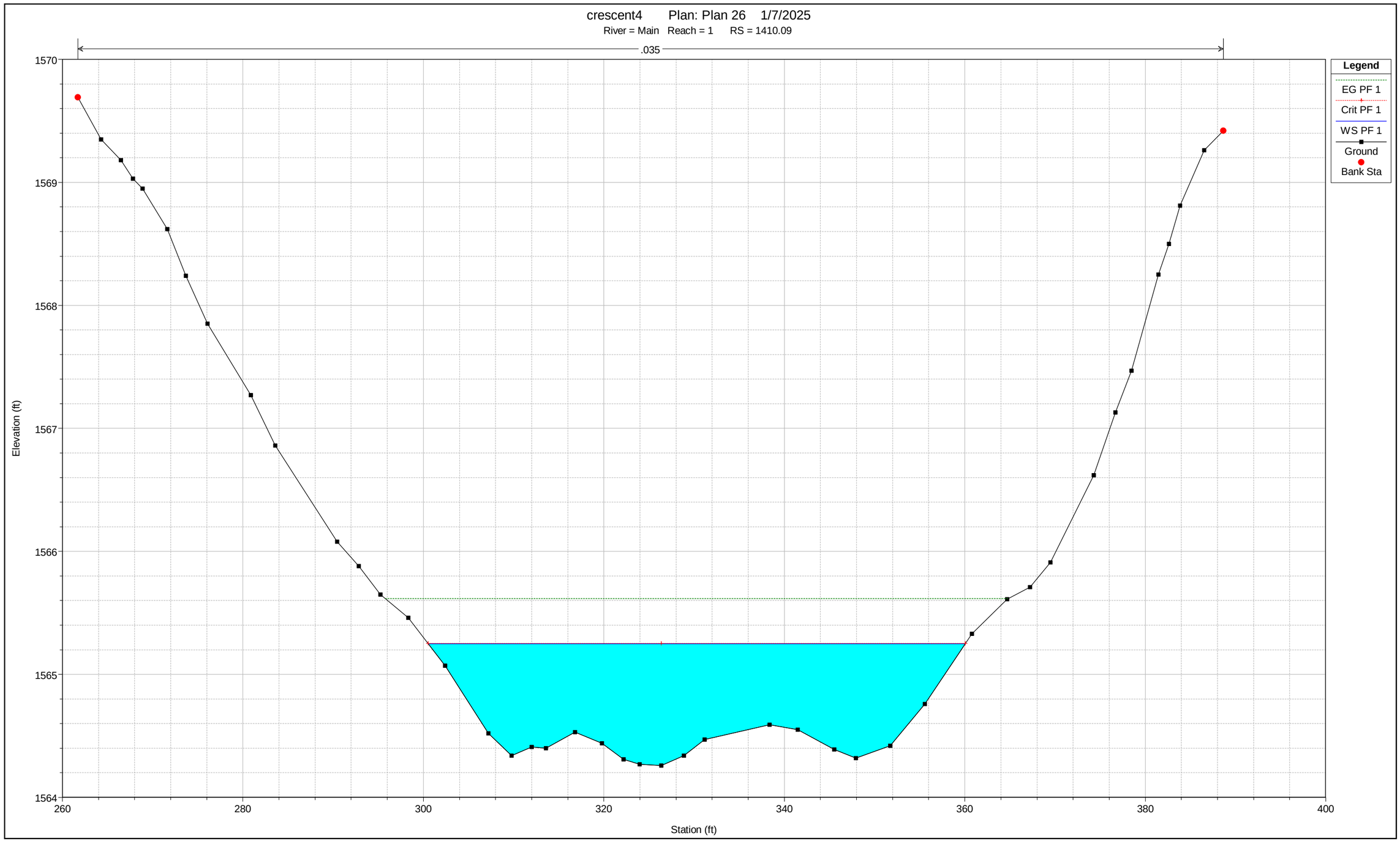
100-year Sections - Main Model



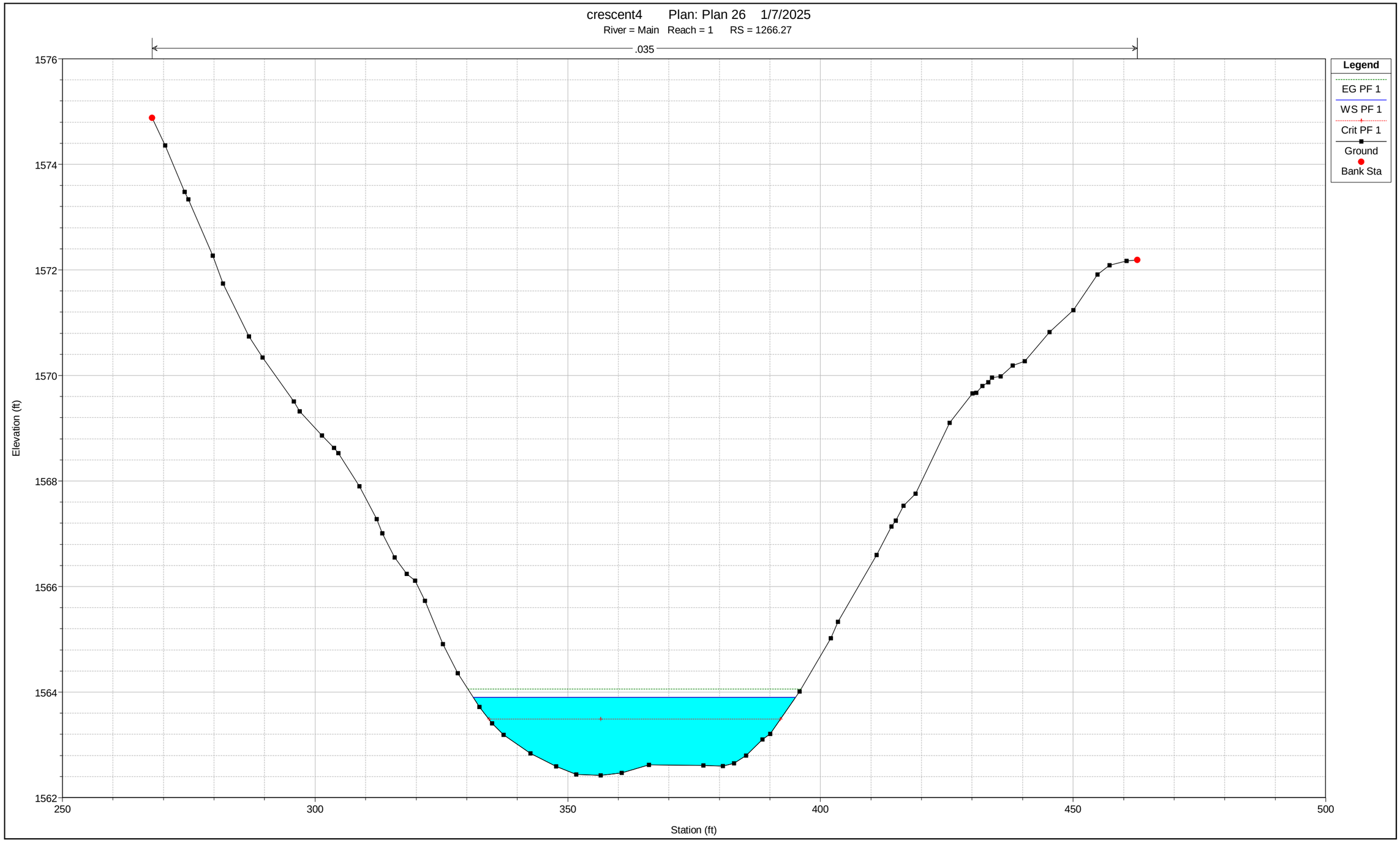
100-year Sections - Main Model



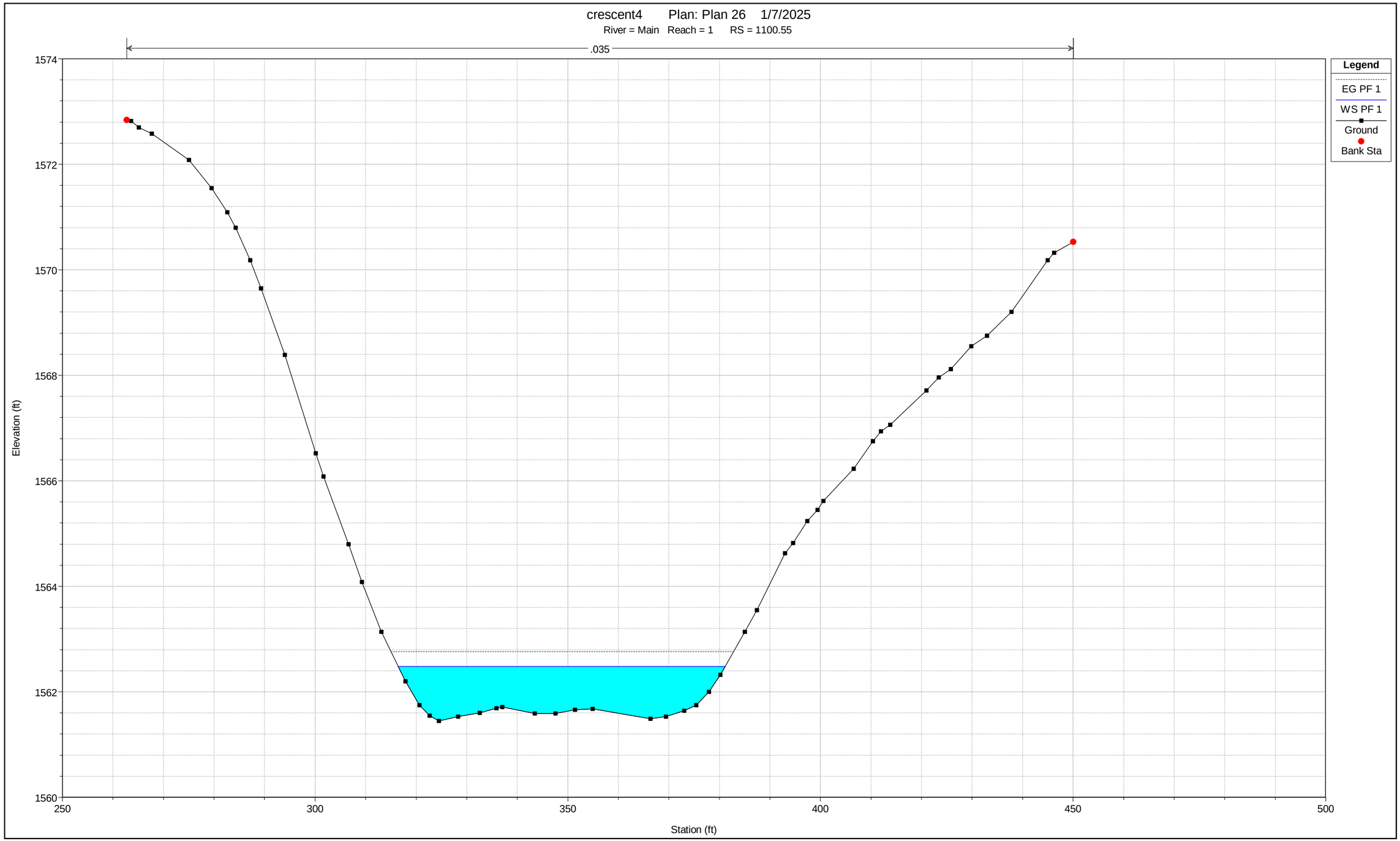
100-year Sections - Main Model



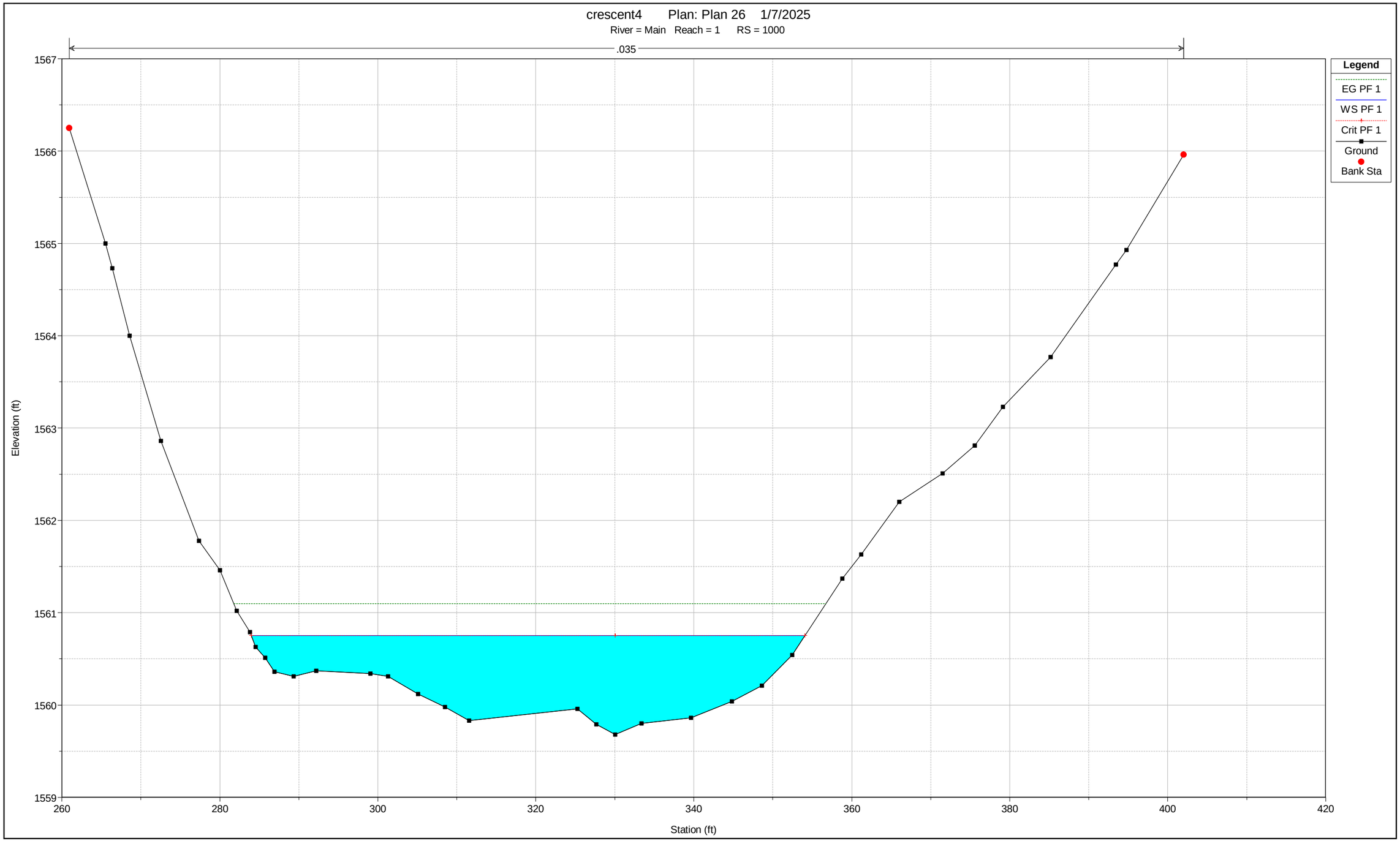
100-year Sections - Main Model



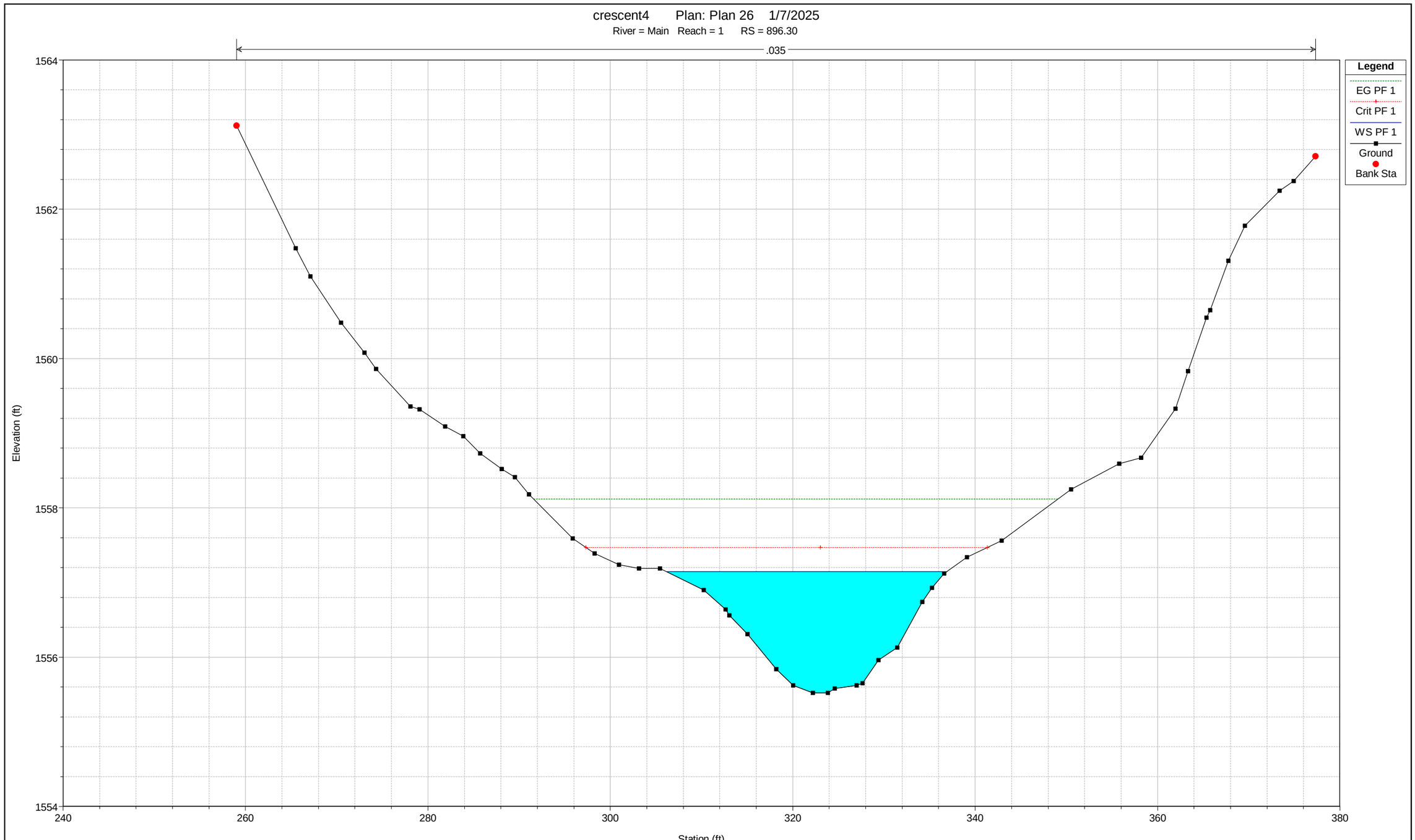
100-year Sections - Main Model



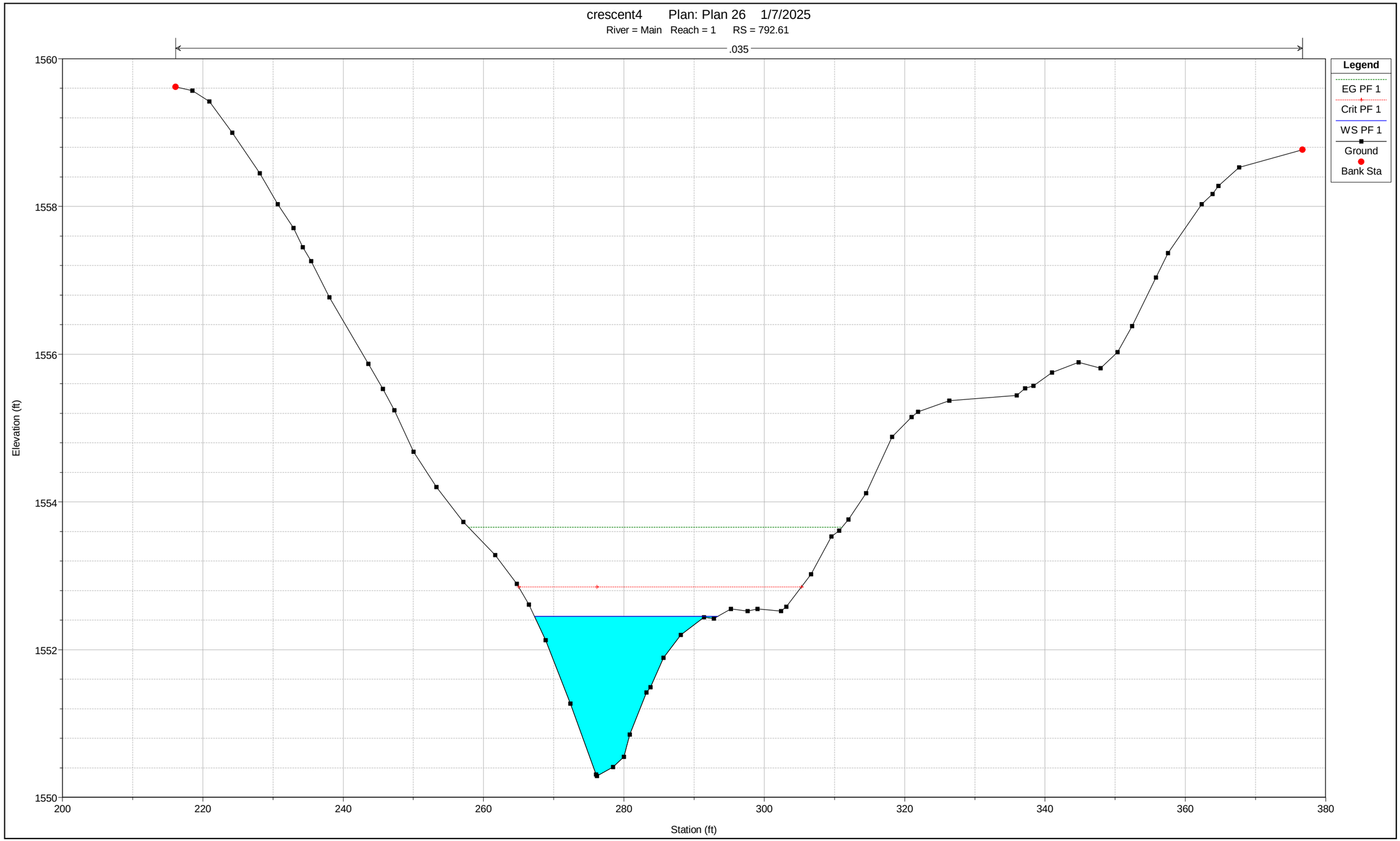
100-year Sections - Main Model



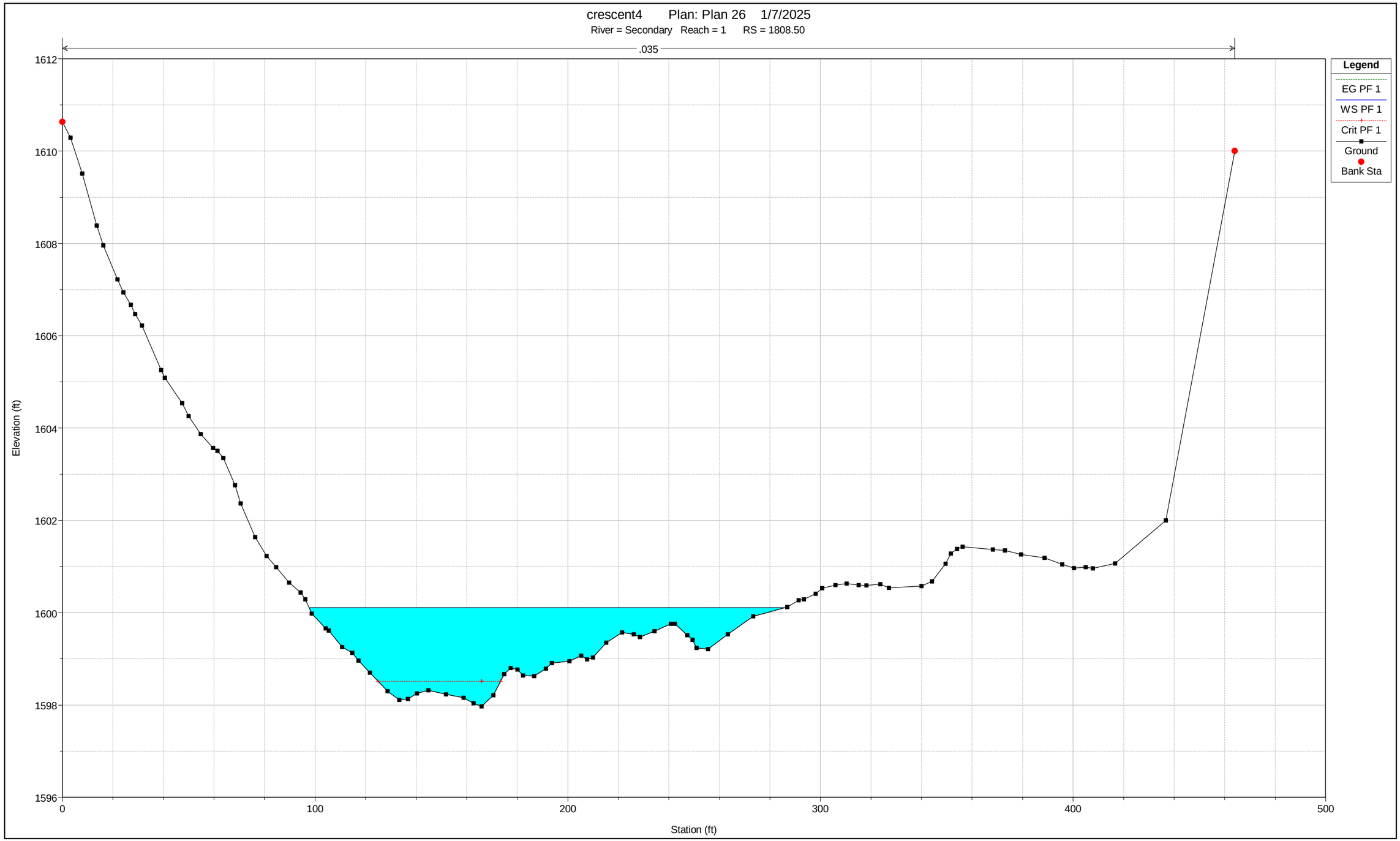
100-year Sections - Main Model



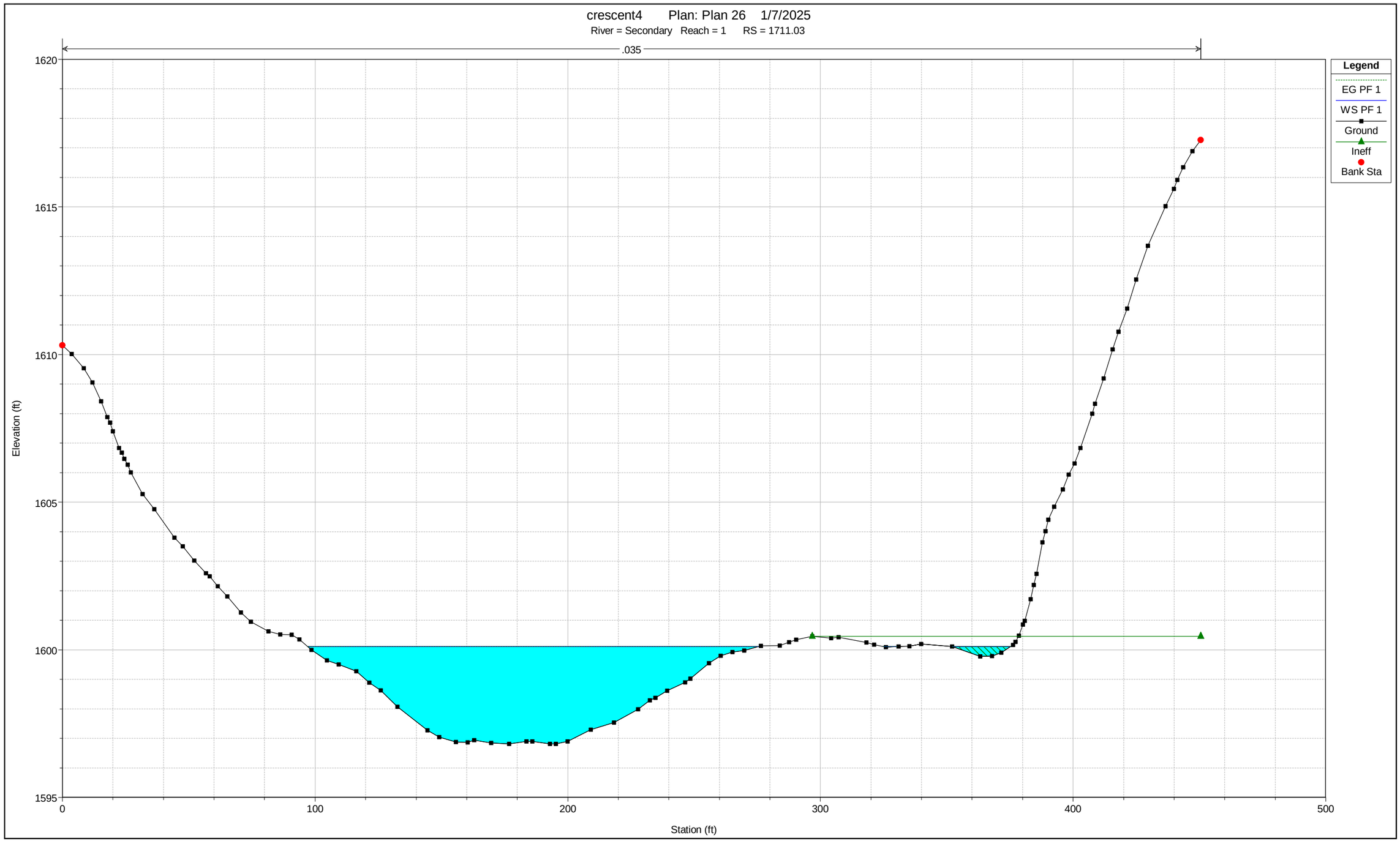
100-year Sections - Main Model



100-year Sections - Secondary Model



100-year Sections - Secondary Model



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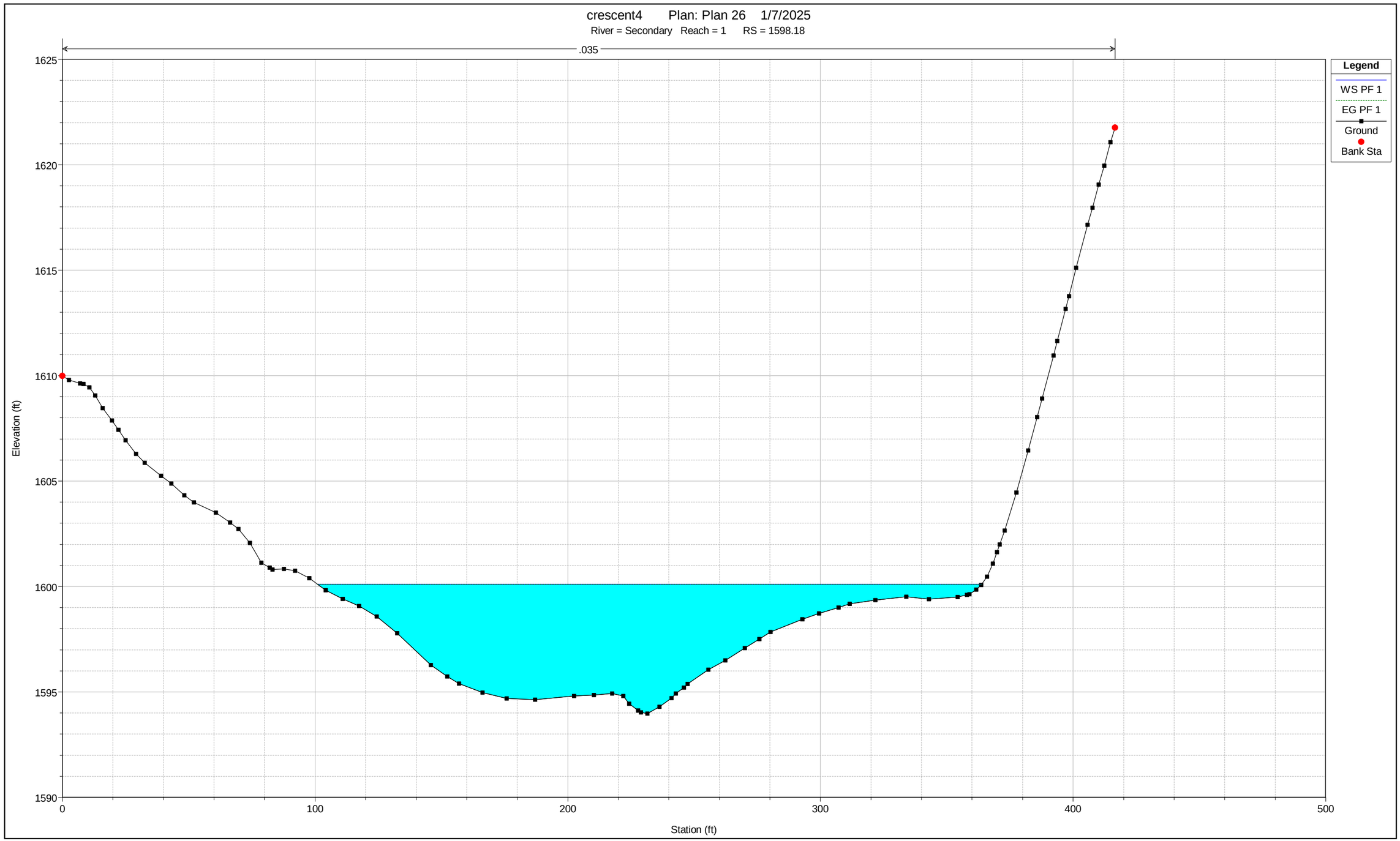
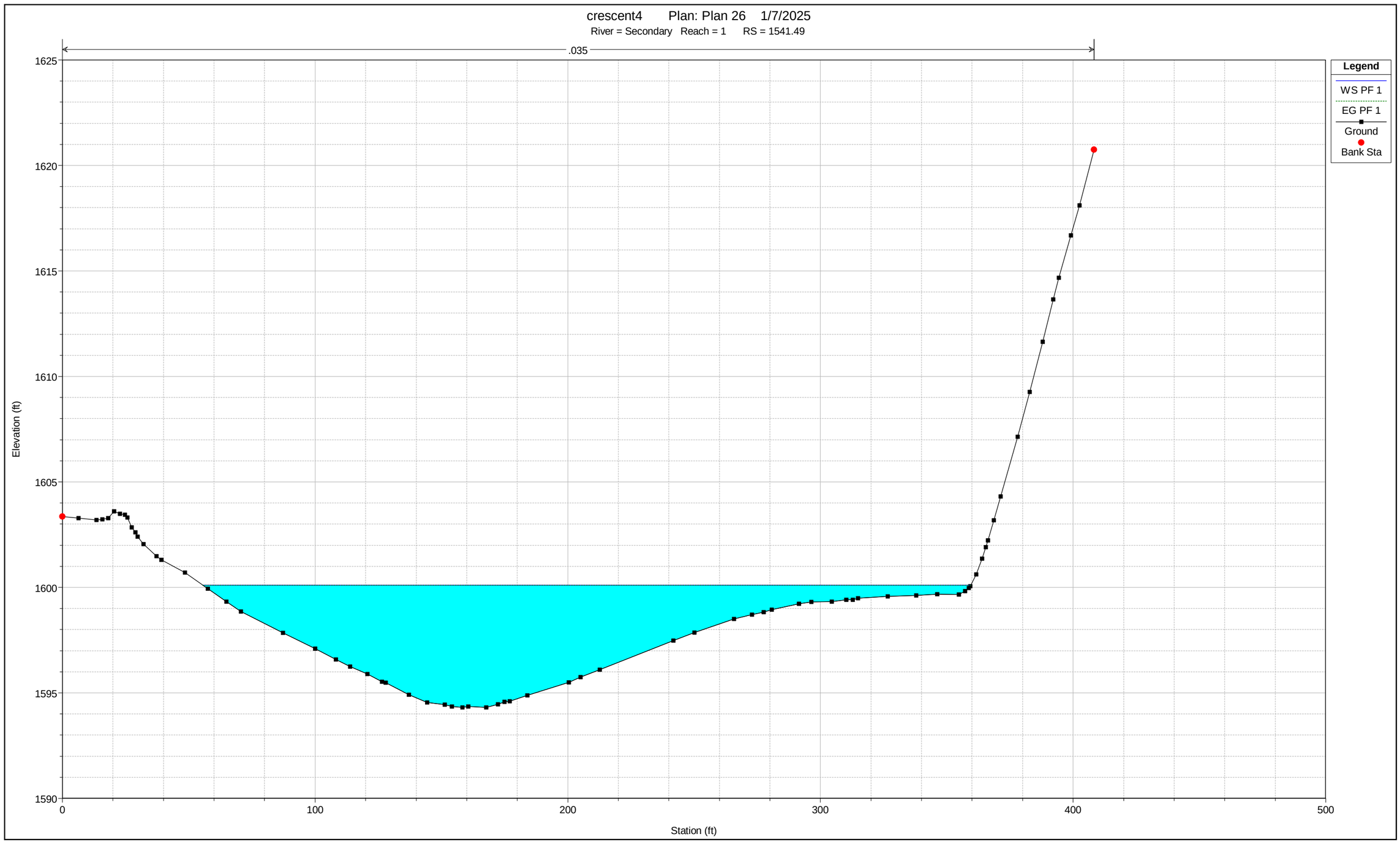
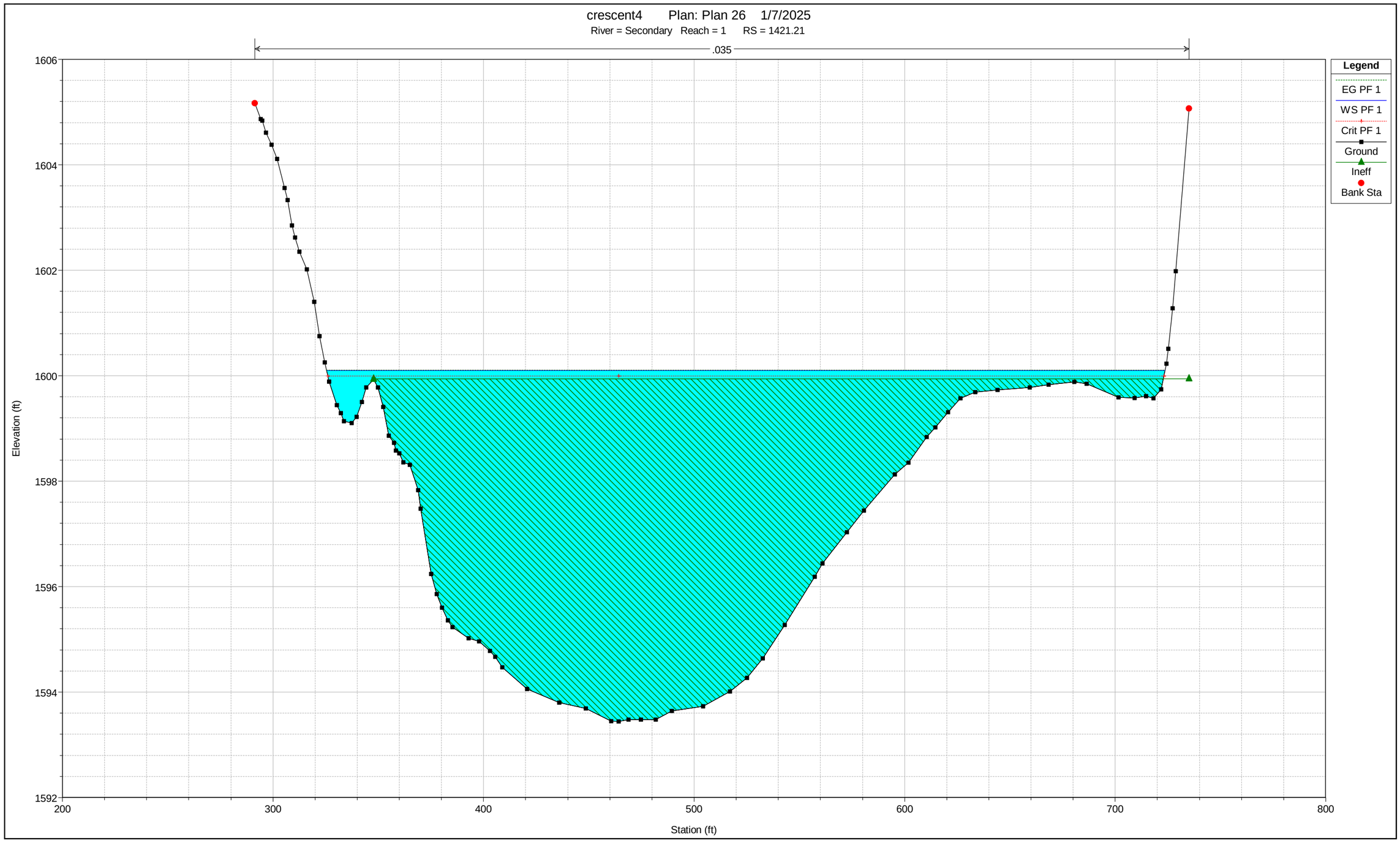


100-year Sections - Secondary Model



100-year Sections - Secondary Model



Plan: Plan 26 Main 1 RS: 2920.27 Profile: PF 1

E.G. Elev (ft)	1603.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	1603.55	Reach Len. (ft)	165.50	179.85	143.72
Crit W.S. (ft)	1603.55	Flow Area (sq ft)		29.26	
E.G. Slope (ft/ft)	0.020161	Area (sq ft)		29.26	
Q Total (cfs)	147.00	Flow (cfs)		147.00	
Top Width (ft)	38.31	Top Width (ft)		38.31	
Vel Total (ft/s)	5.02	Avg. Vel. (ft/s)		5.02	
Max Chl Dpth (ft)	1.38	Hydr. Depth (ft)		0.76	
Conv. Total (cfs)	1035.3	Conv. (cfs)		1035.3	
Length Wtd. (ft)	179.85	Wetted Per. (ft)		38.44	
Min Ch El (ft)	1602.17	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)		4.81	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		9.99	
C & E Loss (ft)	0.12	Cum SA (acres)		4.98	

Plan: Plan 26 Main 1 RS: 2740.42 Profile: PF 1

E.G. Elev (ft)	1603.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1603.24	Reach Len. (ft)	116.80	130.19	142.30
Crit W.S. (ft)	1601.21	Flow Area (sq ft)		214.48	
E.G. Slope (ft/ft)	0.000102	Area (sq ft)		214.48	
Q Total (cfs)	147.00	Flow (cfs)		147.00	
Top Width (ft)	106.02	Top Width (ft)		106.02	
Vel Total (ft/s)	0.69	Avg. Vel. (ft/s)		0.69	
Max Chl Dpth (ft)	2.90	Hydr. Depth (ft)		2.02	
Conv. Total (cfs)	14521.1	Conv. (cfs)		14521.1	
Length Wtd. (ft)	130.19	Wetted Per. (ft)		106.50	
Min Ch El (ft)	1600.34	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		9.49	
C & E Loss (ft)	0.00	Cum SA (acres)		4.68	

Plan: Plan 26 Main 1 RS: 2610.23 Profile: PF 1

E.G. Elev (ft)	1603.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1603.22	Reach Len. (ft)	29.96	29.96	29.96
Crit W.S. (ft)	1601.05	Flow Area (sq ft)		169.77	
E.G. Slope (ft/ft)	0.000200	Area (sq ft)		169.77	
Q Total (cfs)	147.00	Flow (cfs)		147.00	
Top Width (ft)	96.91	Top Width (ft)		96.91	
Vel Total (ft/s)	0.87	Avg. Vel. (ft/s)		0.87	
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		1.75	
Conv. Total (cfs)	10397.2	Conv. (cfs)		10397.2	
Length Wtd. (ft)	29.96	Wetted Per. (ft)		97.99	
Min Ch El (ft)	1599.02	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)		Cum Volume (acre-ft)		8.91	
C & E Loss (ft)		Cum SA (acres)		4.38	

Plan: Plan 26 Main 1 RS: 2580.27 Profile: PF 1

E.G. Elev (ft)	1602.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.035	
W.S. Elev (ft)	1602.05	Reach Len. (ft)	60.80	103.80	151.30
Crit W.S. (ft)		Flow Area (sq ft)		42.14	
E.G. Slope (ft/ft)	0.011406	Area (sq ft)		42.14	
Q Total (cfs)	147.00	Flow (cfs)		147.00	
Top Width (ft)	59.00	Top Width (ft)		59.00	
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)		3.49	
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	1376.4	Conv. (cfs)		1376.4	
Length Wtd. (ft)	103.80	Wetted Per. (ft)		62.46	
Min Ch El (ft)	1598.79	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)		1.68	
Frctn Loss (ft)	2.01	Cum Volume (acre-ft)		8.88	
C & E Loss (ft)	0.03	Cum SA (acres)		4.33	

Plan: Plan 26 Main 1 RS: 2481.34 Profile: PF 1

E.G. Elev (ft)	1600.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.10	Reach Len. (ft)	141.24	118.08	44.70
Crit W.S. (ft)	1600.10	Flow Area (sq ft)		74.90	
E.G. Slope (ft/ft)	0.033215	Area (sq ft)		1308.20	
Q Total (cfs)	190.00	Flow (cfs)		190.00	
Top Width (ft)	398.28	Top Width (ft)		398.28	
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)		2.54	
Max Chl Dpth (ft)	6.66	Hydr. Depth (ft)		0.19	
Conv. Total (cfs)	1042.5	Conv. (cfs)		1042.5	
Length Wtd. (ft)	118.08	Wetted Per. (ft)		399.00	
Min Ch El (ft)	1593.44	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		0.99	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		7.27	
C & E Loss (ft)	0.01	Cum SA (acres)		3.78	

Plan: Plan 26 Main 1 RS: 2363.27 Profile: PF 1

E.G. Elev (ft)	1597.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	1597.33	Reach Len. (ft)	168.50	164.14	157.00
Crit W.S. (ft)	1597.25	Flow Area (sq ft)		71.69	
E.G. Slope (ft/ft)	0.014572	Area (sq ft)		421.37	
Q Total (cfs)	190.00	Flow (cfs)		190.00	
Top Width (ft)	192.37	Top Width (ft)		192.37	
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)		2.65	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)		0.37	
Conv. Total (cfs)	1573.9	Conv. (cfs)		1573.9	
Length Wtd. (ft)	164.14	Wetted Per. (ft)		192.78	
Min Ch El (ft)	1593.51	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		0.90	
Frctn Loss (ft)	3.34	Cum Volume (acre-ft)		4.93	
C & E Loss (ft)	0.00	Cum SA (acres)		2.98	

Plan: Plan 26 Main 1 RS: 2199.13 Profile: PF 1

E.G. Elev (ft)	1594.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	1593.93	Reach Len. (ft)	85.75	187.77	269.81
Crit W.S. (ft)	1593.93	Flow Area (sq ft)		59.45	
E.G. Slope (ft/ft)	0.030470	Area (sq ft)		642.79	
Q Total (cfs)	190.00	Flow (cfs)		190.00	
Top Width (ft)	209.08	Top Width (ft)		209.08	
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		0.28	
Conv. Total (cfs)	1088.5	Conv. (cfs)		1088.5	
Length Wtd. (ft)	187.77	Wetted Per. (ft)		209.92	
Min Ch El (ft)	1588.70	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		1.72	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		2.92	
C & E Loss (ft)	0.00	Cum SA (acres)		2.23	

Plan: Plan 26 Main 1 RS: 2011.36 Profile: PF 1

E.G. Elev (ft)	1587.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1587.79	Reach Len. (ft)	91.71	73.12	76.36
Crit W.S. (ft)	1585.87	Flow Area (sq ft)		204.29	
E.G. Slope (ft/ft)	0.000245	Area (sq ft)		204.29	
Q Total (cfs)	190.00	Flow (cfs)		190.00	
Top Width (ft)	122.81	Top Width (ft)		122.81	
Vel Total (ft/s)	0.93	Avg. Vel. (ft/s)		0.93	
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	12146.3	Conv. (cfs)		12146.3	
Length Wtd. (ft)	73.12	Wetted Per. (ft)		123.27	
Min Ch El (ft)	1584.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)		Cum Volume (acre-ft)		1.10	
C & E Loss (ft)		Cum SA (acres)		1.51	

Plan: Plan 26 Main 1 RS: 1938.24 Profile: PF 1

E.G. Elev (ft)	1585.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.035	
W.S. Elev (ft)	1585.25	Reach Len. (ft)	208.86	200.05	184.91
Crit W.S. (ft)	1585.32	Flow Area (sq ft)		35.18	
E.G. Slope (ft/ft)	0.030549	Area (sq ft)		35.18	
Q Total (cfs)	196.00	Flow (cfs)		190.00	
Top Width (ft)	53.26	Top Width (ft)		53.26	
Vel Total (ft/s)	5.40	Avg. Vel. (ft/s)		5.40	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	1121.4	Conv. (cfs)		1121.4	
Length Wtd. (ft)	200.05	Wetted Per. (ft)		54.06	
Min Ch El (ft)	1584.00	Shear (lb/sq ft)		1.24	
Alpha	1.00	Stream Power (lb/ft s)		6.70	
Frctn Loss (ft)	5.29	Cum Volume (acre-ft)		1.06	
C & E Loss (ft)	0.00	Cum SA (acres)		1.36	

Plan: Plan 26 Main 1 RS: 1738.19 Profile: PF 1

E.G. Elev (ft)	1580.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.035	
W.S. Elev (ft)	1579.96	Reach Len. (ft)	160.13	172.32	176.09
Crit W.S. (ft)	1580.01	Flow Area (sq ft)		35.16	
E.G. Slope (ft/ft)	0.023126	Area (sq ft)		35.16	
Q Total (cfs)	196.00	Flow (cfs)		196.00	
Top Width (ft)	43.67	Top Width (ft)		43.67	
Vel Total (ft/s)	5.57	Avg. Vel. (ft/s)		5.57	
Max Chl Dpth (ft)	1.70	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	1288.8	Conv. (cfs)		1288.8	
Length Wtd. (ft)	172.32	Wetted Per. (ft)		43.83	
Min Ch El (ft)	1578.26	Shear (lb/sq ft)		1.16	
Alpha	1.00	Stream Power (lb/ft s)		6.46	
Frctn Loss (ft)	8.99	Cum Volume (acre-ft)		0.90	
C & E Loss (ft)	0.14	Cum SA (acres)		1.14	

Plan: Plan 26 Main 1 RS: 1563.87 Profile: PF 1

E.G. Elev (ft)	1571.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.86	Wt. n-Val.		0.035	
W.S. Elev (ft)	1569.46	Reach Len. (ft)	138.76	153.78	158.76
Crit W.S. (ft)	1569.92	Flow Area (sq ft)		18.56	
E.G. Slope (ft/ft)	0.196619	Area (sq ft)		18.56	
Q Total (cfs)	203.00	Flow (cfs)		203.00	
Top Width (ft)	41.84	Top Width (ft)		41.84	
Vel Total (ft/s)	10.94	Avg. Vel. (ft/s)		10.94	
Max Chl Dpth (ft)	0.84	Hydr. Depth (ft)		0.44	
Conv. Total (cfs)	457.8	Conv. (cfs)		457.8	
Length Wtd. (ft)	153.78	Wetted Per. (ft)		41.90	
Min Ch El (ft)	1568.62	Shear (lb/sq ft)		5.44	
Alpha	1.00	Stream Power (lb/ft s)		59.48	
Frctn Loss (ft)	3.12	Cum Volume (acre-ft)		0.79	
C & E Loss (ft)	0.01	Cum SA (acres)		0.97	

Plan: Plan 26 Main 1 RS: 1410.09 Profile: PF 1

E.G. Elev (ft)	1565.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	1565.25	Reach Len. (ft)	143.82	143.82	143.82
Crit W.S. (ft)	1565.25	Flow Area (sq ft)		42.65	
E.G. Slope (ft/ft)	0.020433	Area (sq ft)		42.65	
Q Total (cfs)	207.00	Flow (cfs)		207.00	
Top Width (ft)	59.54	Top Width (ft)		59.54	
Vel Total (ft/s)	4.85	Avg. Vel. (ft/s)		4.85	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	1448.1	Conv. (cfs)		1448.1	
Length Wtd. (ft)	143.82	Wetted Per. (ft)		59.64	
Min Ch El (ft)	1564.26	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		4.43	
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)		0.68	
C & E Loss (ft)	0.06	Cum SA (acres)		0.79	

Plan: Plan 26 Main 1 RS: 1266.27 Profile: PF 1

E.G. Elev (ft)	1564.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	1563.90	Reach Len. (ft)	165.72	165.72	165.72
Crit W.S. (ft)	1563.49	Flow Area (sq ft)		69.60	
E.G. Slope (ft/ft)	0.005043	Area (sq ft)		69.60	
Q Total (cfs)	222.00	Flow (cfs)		222.00	
Top Width (ft)	63.82	Top Width (ft)		63.82	
Vel Total (ft/s)	3.19	Avg. Vel. (ft/s)		3.19	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	3126.1	Conv. (cfs)		3126.1	
Length Wtd. (ft)	165.72	Wetted Per. (ft)		63.95	
Min Ch El (ft)	1562.42	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		1.09	
Frctn Loss (ft)	1.28	Cum Volume (acre-ft)		0.50	
C & E Loss (ft)	0.01	Cum SA (acres)		0.59	

Plan: Plan 26 Main 1 RS: 1100.55 Profile: PF 1

E.G. Elev (ft)	1562.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.035	
W.S. Elev (ft)	1562.48	Reach Len. (ft)	100.55	100.55	100.55
Crit W.S. (ft)		Flow Area (sq ft)		52.27	
E.G. Slope (ft/ft)	0.013347	Area (sq ft)		52.27	
Q Total (cfs)	222.00	Flow (cfs)		222.00	
Top Width (ft)	64.73	Top Width (ft)		64.73	
Vel Total (ft/s)	4.25	Avg. Vel. (ft/s)		4.25	
Max Chl Dpth (ft)	1.03	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	1921.6	Conv. (cfs)		1921.6	
Length Wtd. (ft)	100.55	Wetted Per. (ft)		64.86	
Min Ch El (ft)	1561.45	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)		2.85	
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)		0.27	
C & E Loss (ft)	0.01	Cum SA (acres)		0.34	

Plan: Plan 26 Main 1 RS: 1000 Profile: PF 1

E.G. Elev (ft)	1561.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	1560.75	Reach Len. (ft)	103.70	103.70	103.70
Crit W.S. (ft)	1560.75	Flow Area (sq ft)		47.15	
E.G. Slope (ft/ft)	0.020909	Area (sq ft)		47.15	
Q Total (cfs)	222.00	Flow (cfs)		222.00	
Top Width (ft)	70.09	Top Width (ft)		70.09	
Vel Total (ft/s)	4.71	Avg. Vel. (ft/s)		4.71	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	1535.3	Conv. (cfs)		1535.3	
Length Wtd. (ft)	103.70	Wetted Per. (ft)		70.18	
Min Ch El (ft)	1559.68	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)		4.13	
Frctn Loss (ft)	2.92	Cum Volume (acre-ft)		0.15	
C & E Loss (ft)	0.06	Cum SA (acres)		0.19	

Plan: Plan 26 Main 1 RS: 896.30 Profile: PF 1

E.G. Elev (ft)	1558.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.035	
W.S. Elev (ft)	1557.15	Reach Len. (ft)	103.69	103.69	103.69
Crit W.S. (ft)	1557.47	Flow Area (sq ft)		28.09	
E.G. Slope (ft/ft)	0.039446	Area (sq ft)		28.09	
Q Total (cfs)	222.00	Flow (cfs)		222.00	
Top Width (ft)	30.73	Top Width (ft)		30.73	
Vel Total (ft/s)	7.90	Avg. Vel. (ft/s)		7.90	
Max Chl Dpth (ft)	1.63	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	1117.8	Conv. (cfs)		1117.8	
Length Wtd. (ft)	103.69	Wetted Per. (ft)		30.96	
Min Ch El (ft)	1555.52	Shear (lb/sq ft)		2.23	
Alpha	1.00	Stream Power (lb/ft s)		17.66	
Frctn Loss (ft)	4.43	Cum Volume (acre-ft)		0.06	
C & E Loss (ft)	0.02	Cum SA (acres)		0.07	

Plan: Plan 26 Main 1 RS: 792.61 Profile: PF 1

E.G. Elev (ft)	1553.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	1552.45	Reach Len. (ft)			
Crit W.S. (ft)	1552.85	Flow Area (sq ft)		25.19	
E.G. Slope (ft/ft)	0.046404	Area (sq ft)		25.19	
Q Total (cfs)	222.00	Flow (cfs)		222.00	
Top Width (ft)	26.15	Top Width (ft)		26.15	
Vel Total (ft/s)	8.81	Avg. Vel. (ft/s)		8.81	
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	1030.6	Conv. (cfs)		1030.6	
Length Wtd. (ft)		Wetted Per. (ft)		26.62	
Min Ch El (ft)	1550.29	Shear (lb/sq ft)		2.74	
Alpha	1.00	Stream Power (lb/ft s)		24.16	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Plan 26 Main 1 RS: 2609.73 Culv Group: Culvert #1 Profile: PF 1

Q Culv Group (cfs)	93.90	Culv Full Len (ft)	29.00
# Barrels	2	Culv Vel US (ft/s)	6.64
Q Barrel (cfs)	46.95	Culv Vel DS (ft/s)	6.64
E.G. US. (ft)	1603.23	Culv Inv El Up (ft)	1599.02
W.S. US. (ft)	1603.22	Culv Inv El Dn (ft)	1598.79
E.G. DS (ft)	1602.24	Culv Frctn Ls (ft)	0.14
W.S. DS (ft)	1602.05	Culv Exit Loss (ft)	0.50
Delta EG (ft)	0.98	Culv Entr Loss (ft)	0.34
Delta WS (ft)	1.16	Q Weir (cfs)	53.10
E.G. IC (ft)	1603.17	Weir Sta Lft (ft)	121.12
E.G. OC (ft)	1603.23	Weir Sta Rgt (ft)	218.26
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	1602.02	Weir Max Depth (ft)	0.49
Culv WS Outlet (ft)	1601.79	Weir Avg Depth (ft)	0.35
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	34.11
Culv Crt Depth (ft)	2.23	Min El Weir Flow (ft)	1602.75

Plan: Plan 26 Main 1 RS: 1981.43 Culv Group: Culvert #1 Profile: PF 1

Q Culv Group (cfs)	190.00	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	6.79
Q Barrel (cfs)	190.00	Culv Vel DS (ft/s)	10.86
E.G. US. (ft)	1587.81	Culv Inv El Up (ft)	1584.50
W.S. US. (ft)	1587.79	Culv Inv El Dn (ft)	1584.00
E.G. DS (ft)	1585.71	Culv Frctn Ls (ft)	0.36
W.S. DS (ft)	1585.33	Culv Exit Loss (ft)	1.37
Delta EG (ft)	2.09	Culv Entr Loss (ft)	0.36
Delta WS (ft)	2.46	Q Weir (cfs)	
E.G. IC (ft)	1587.81	Weir Sta Lft (ft)	
E.G. OC (ft)	1587.63	Weir Sta Rgt (ft)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (ft)	1586.50	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1585.25	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.16	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.79	Min El Weir Flow (ft)	1587.98

Plan: Plan 26 Secondary 1 RS: 1808.50 Profile: PF 1

E.G. Elev (ft)	1600.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.11	Reach Len. (ft)	94.85	97.47	80.28
Crit W.S. (ft)	1598.51	Flow Area (sq ft)		200.71	
E.G. Slope (ft/ft)	0.000028	Area (sq ft)		200.71	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	188.35	Top Width (ft)		188.35	
Vel Total (ft/s)	0.23	Avg. Vel. (ft/s)		0.23	
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)		1.07	
Conv. Total (cfs)	8884.7	Conv. (cfs)		8884.7	
Length Wtd. (ft)	97.47	Wetted Per. (ft)		188.52	
Min Ch El (ft)	1597.97	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		6.17	
C & E Loss (ft)	0.00	Cum SA (acres)		2.39	

Plan: Plan 26 Secondary 1 RS: 1711.03 Profile: PF 1

E.G. Elev (ft)	1600.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.11	Reach Len. (ft)	107.56	112.85	120.66
Crit W.S. (ft)		Flow Area (sq ft)		357.28	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)		361.97	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	206.66	Top Width (ft)		206.66	
Vel Total (ft/s)	0.13	Avg. Vel. (ft/s)		0.13	
Max Chl Dpth (ft)	3.30	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	24083.8	Conv. (cfs)		24083.8	
Length Wtd. (ft)	112.85	Wetted Per. (ft)		178.58	
Min Ch El (ft)	1596.81	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		5.54	
C & E Loss (ft)	0.00	Cum SA (acres)		1.95	

Plan: Plan 26 Secondary 1 RS: 1598.18 Profile: PF 1

E.G. Elev (ft)	1600.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.11	Reach Len. (ft)	72.10	56.69	24.86
Crit W.S. (ft)		Flow Area (sq ft)		805.65	
E.G. Slope (ft/ft)	0.000000	Area (sq ft)		805.65	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	262.88	Top Width (ft)		262.88	
Vel Total (ft/s)	0.06	Avg. Vel. (ft/s)		0.06	
Max Chl Dpth (ft)	6.13	Hydr. Depth (ft)		3.06	
Conv. Total (cfs)	72076.8	Conv. (cfs)		72076.8	
Length Wtd. (ft)	56.69	Wetted Per. (ft)		263.37	
Min Ch El (ft)	1593.98	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.03	
C & E Loss (ft)	0.00	Cum SA (acres)		1.34	

Plan: Plan 26 Secondary 1 RS: 1541.49 Profile: PF 1

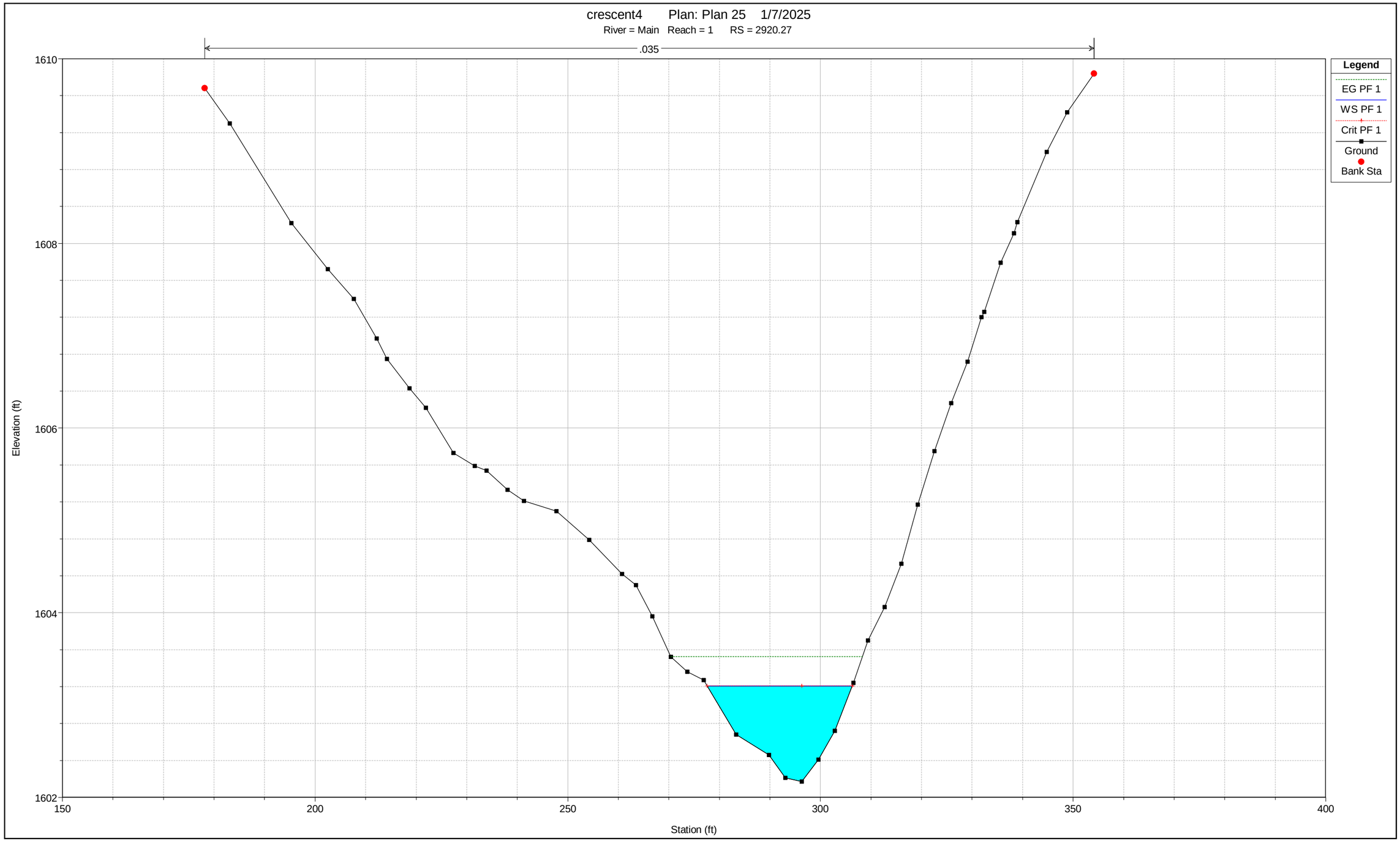
E.G. Elev (ft)	1600.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.11	Reach Len. (ft)	129.05	120.28	40.52
Crit W.S. (ft)		Flow Area (sq ft)		838.47	
E.G. Slope (ft/ft)	0.000000	Area (sq ft)		838.47	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	304.01	Top Width (ft)		304.01	
Vel Total (ft/s)	0.06	Avg. Vel. (ft/s)		0.06	
Max Chl Dpth (ft)	5.80	Hydr. Depth (ft)		2.76	
Conv. Total (cfs)	69959.2	Conv. (cfs)		69959.2	
Length Wtd. (ft)	120.28	Wetted Per. (ft)		304.33	
Min Ch El (ft)	1594.31	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.96	
C & E Loss (ft)	0.00	Cum SA (acres)		0.97	

Plan: Plan 26 Secondary 1 RS: 1421.21 Profile: PF 1

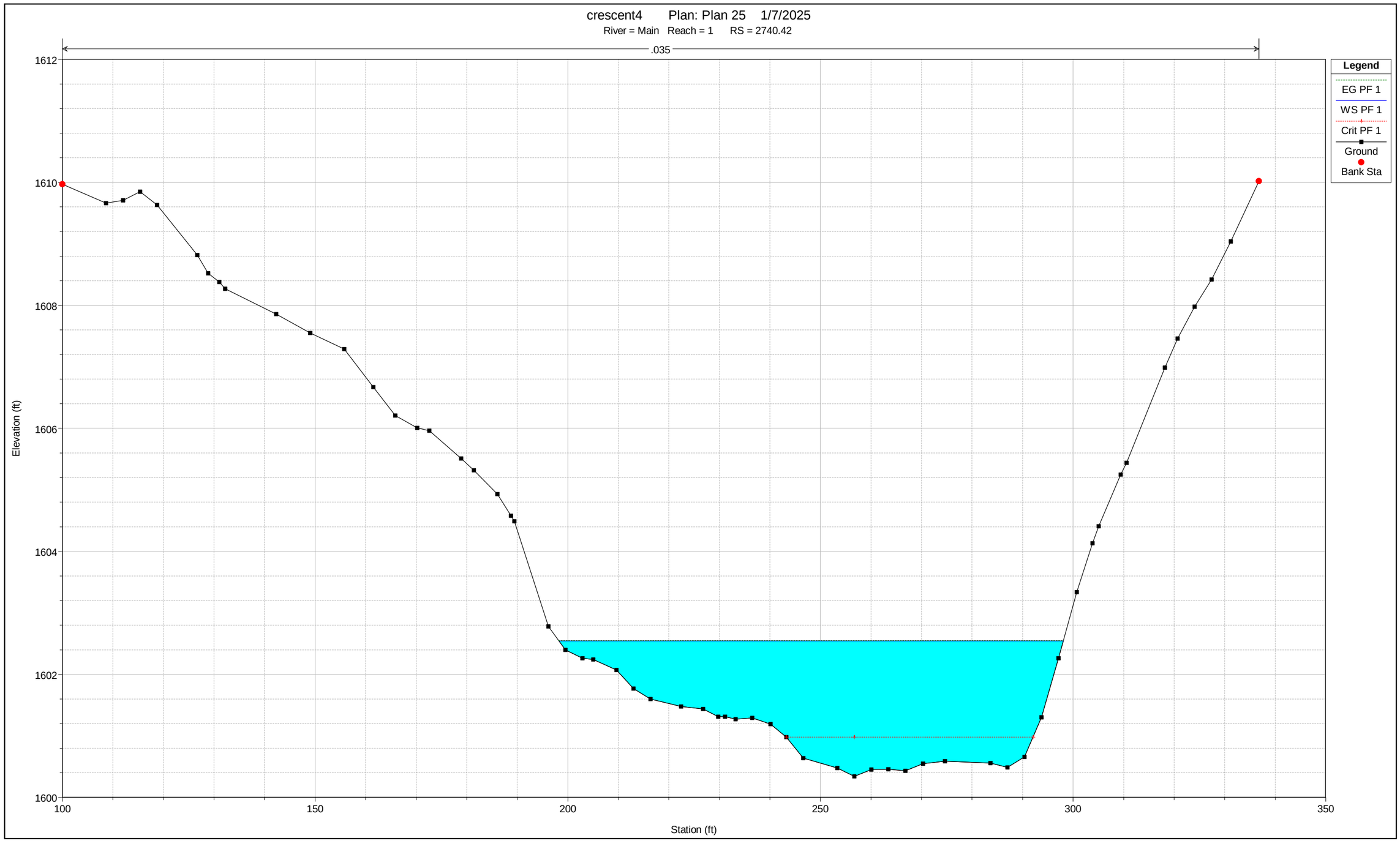
E.G. Elev (ft)	1600.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.10	Reach Len. (ft)			
Crit W.S. (ft)	1600.00	Flow Area (sq ft)		74.03	
E.G. Slope (ft/ft)	0.002113	Area (sq ft)		1307.33	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	398.25	Top Width (ft)		398.25	
Vel Total (ft/s)	0.63	Avg. Vel. (ft/s)		0.63	
Max Chl Dpth (ft)	6.66	Hydr. Depth (ft)		0.19	
Conv. Total (cfs)	1022.4	Conv. (cfs)		1022.4	
Length Wtd. (ft)		Wetted Per. (ft)		398.98	
Min Ch El (ft)	1593.44	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

10-YEAR FLOW

10-year Sections - Main Model



10-year Sections - Main Model



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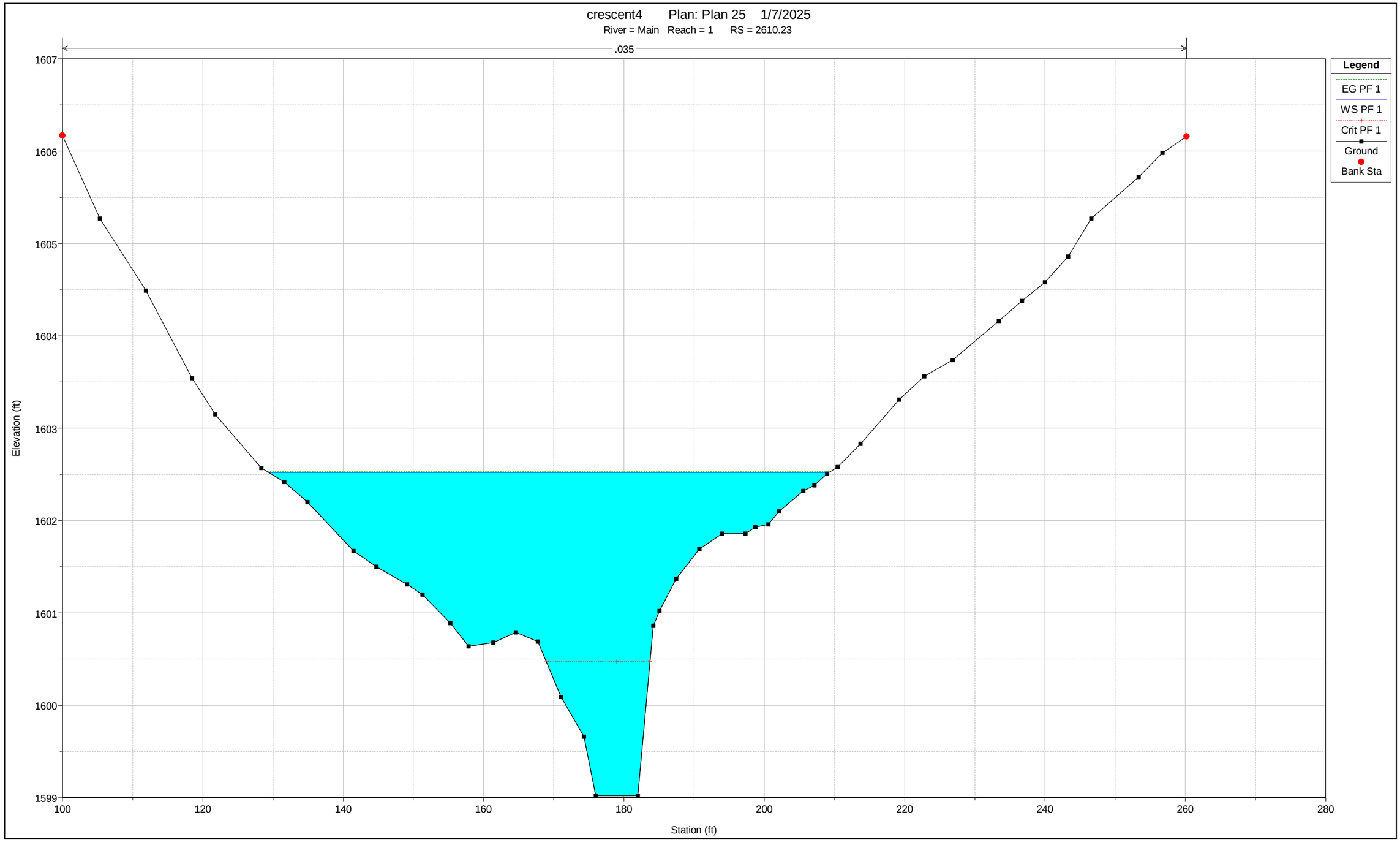

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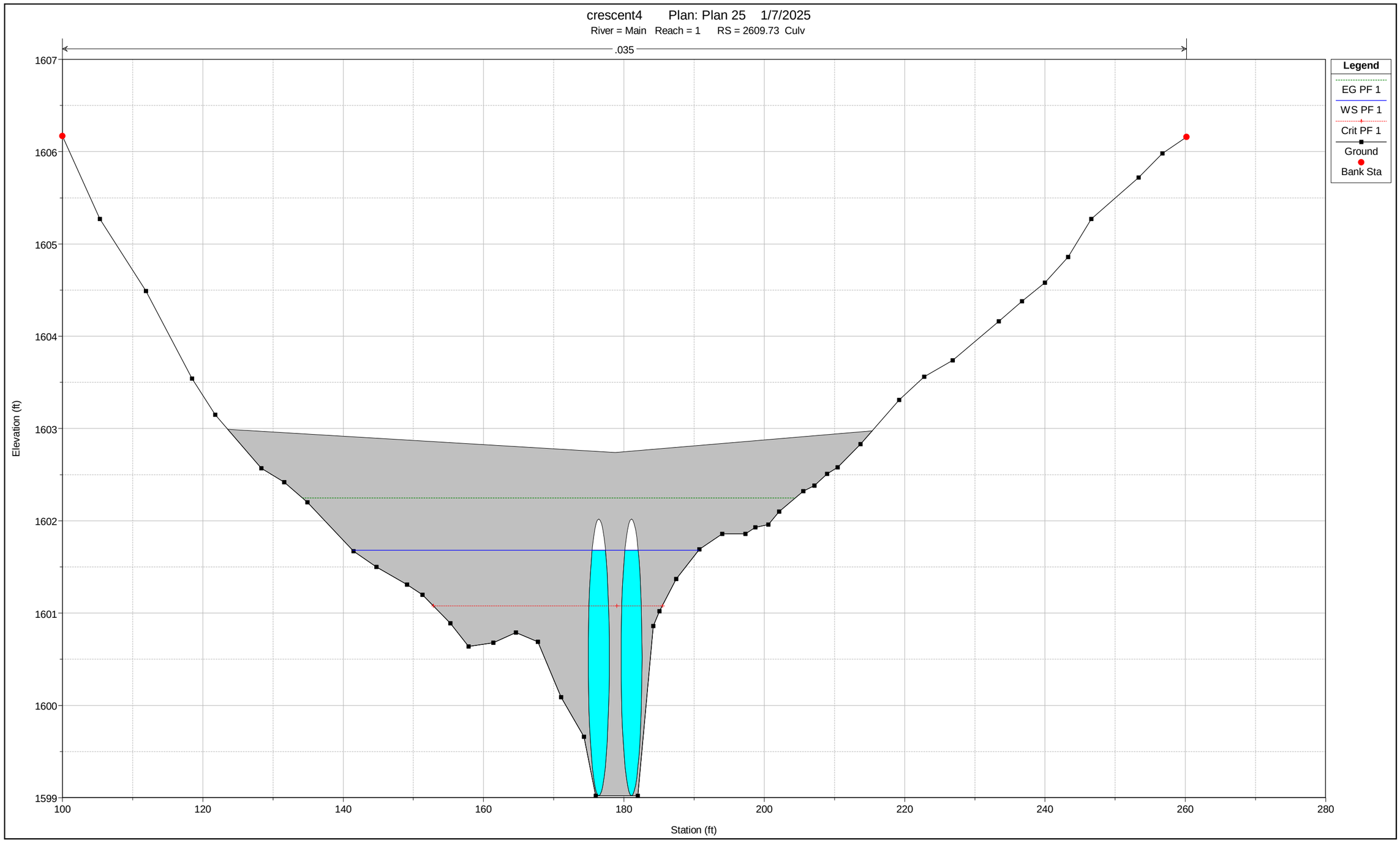

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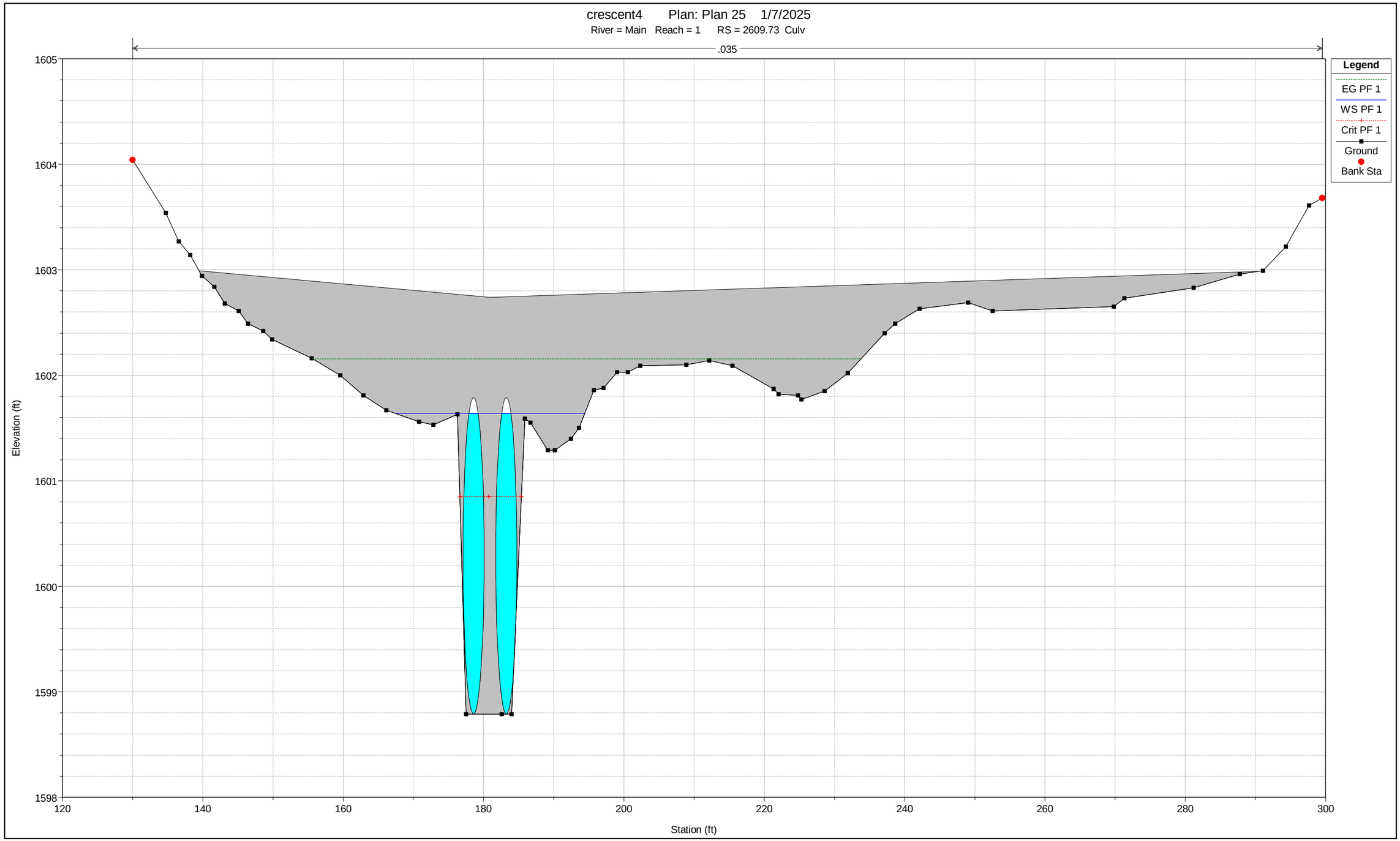
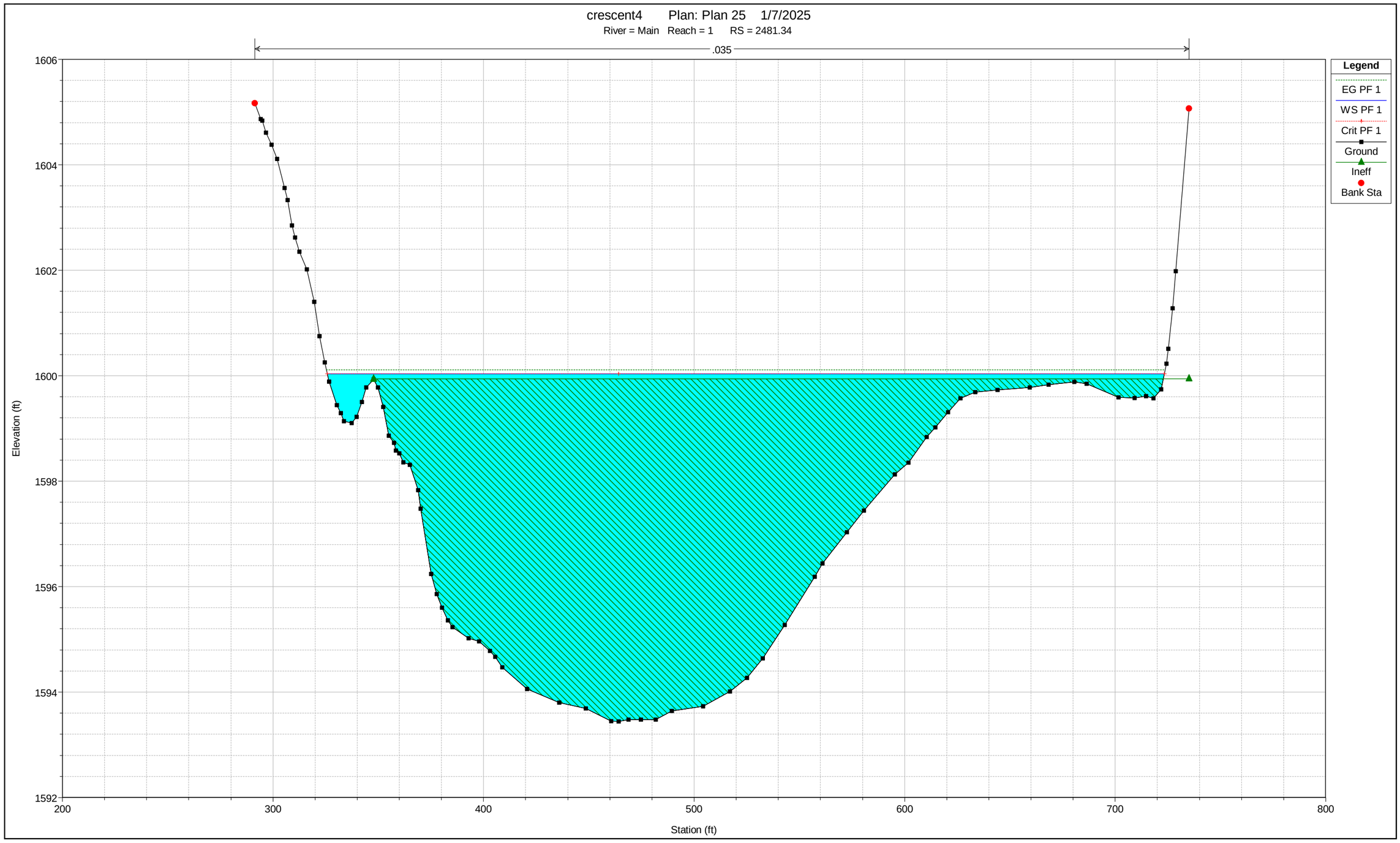


10-year Sections - Main Model



10-year Sections - Main Model



10-year Sections - Main Model

crescent4 Plan: Plan 25 1/7/2025

River = Main Reach = 1 RS = 2363.27

.035

Legend

EG PF 1

WS PF 1

Crit PF 1

Ground

Ineff

Bank Sta

Elevation (ft)

1601

1600

1599

1598

1597

1596

1595

1594

1593

200

300

400

500

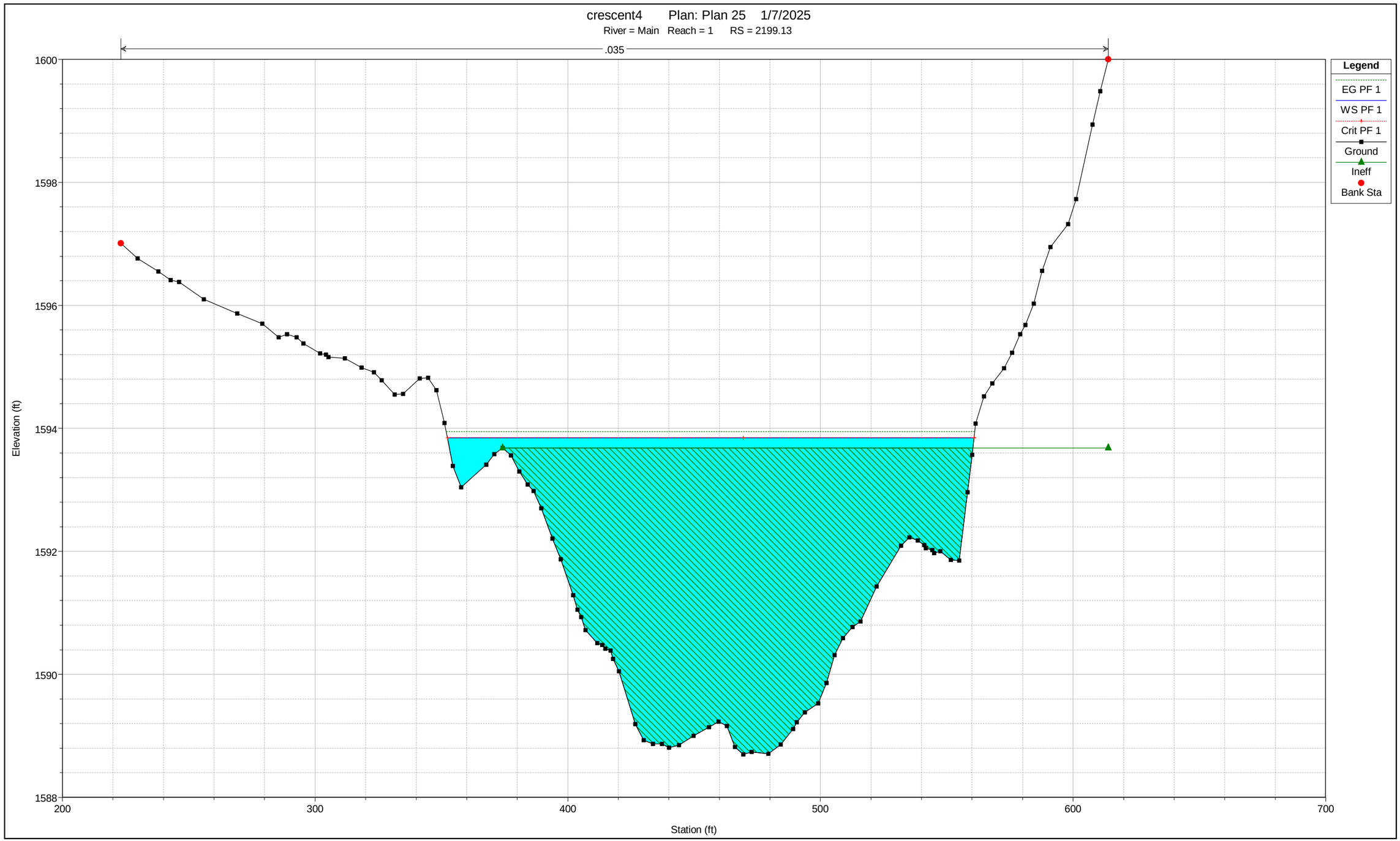
600

700

800

Station (ft)

10-year Sections - Main Model



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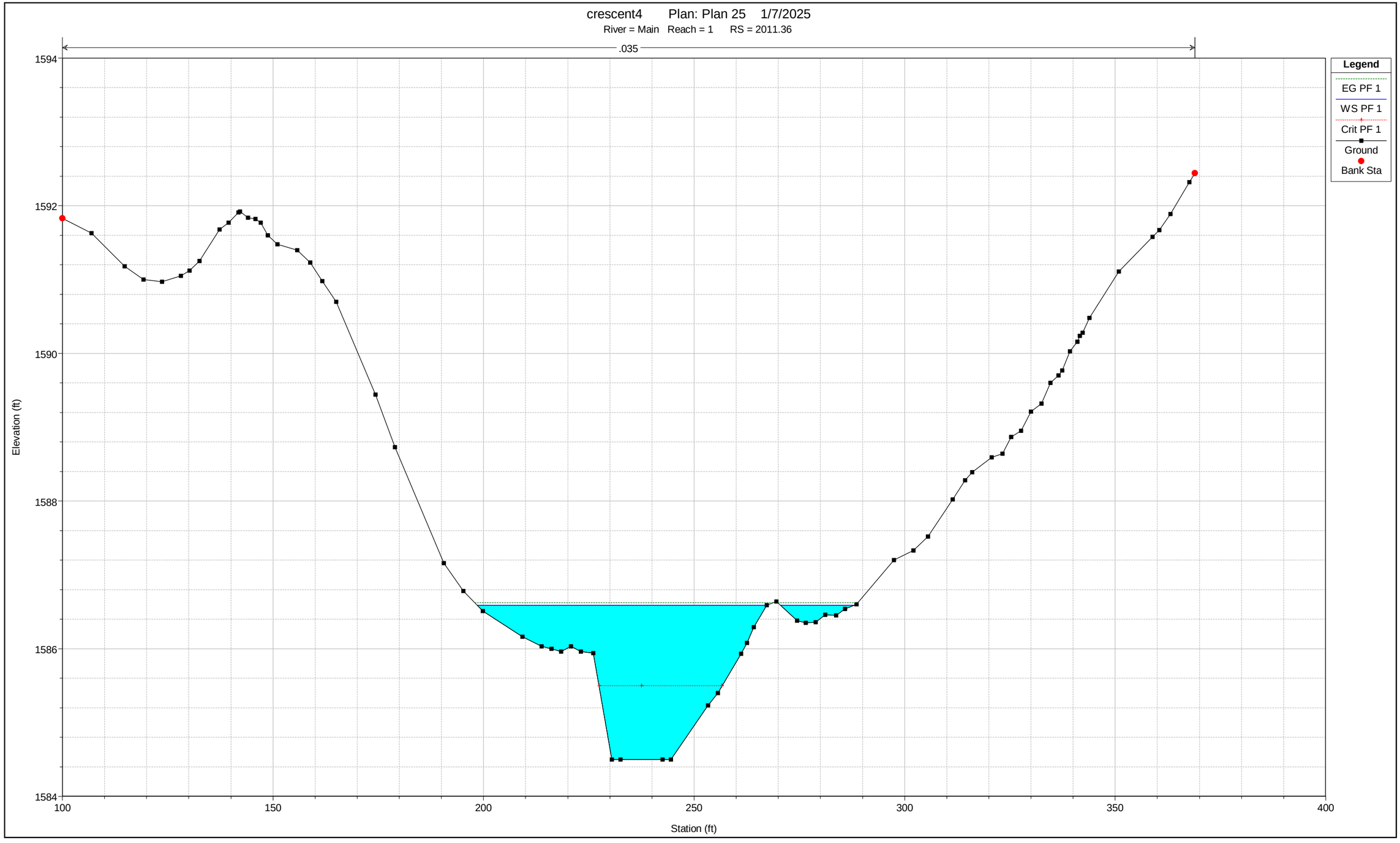

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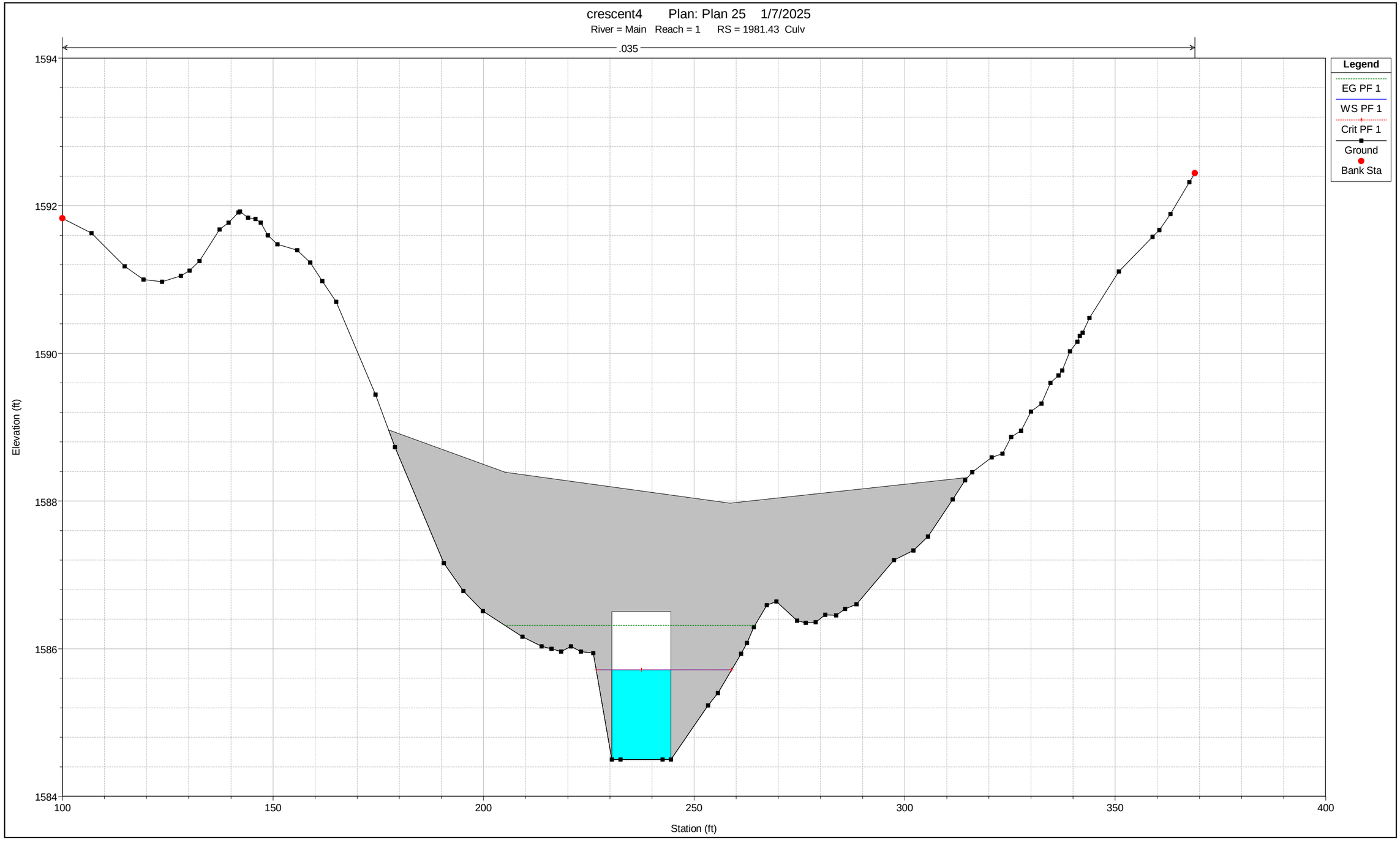
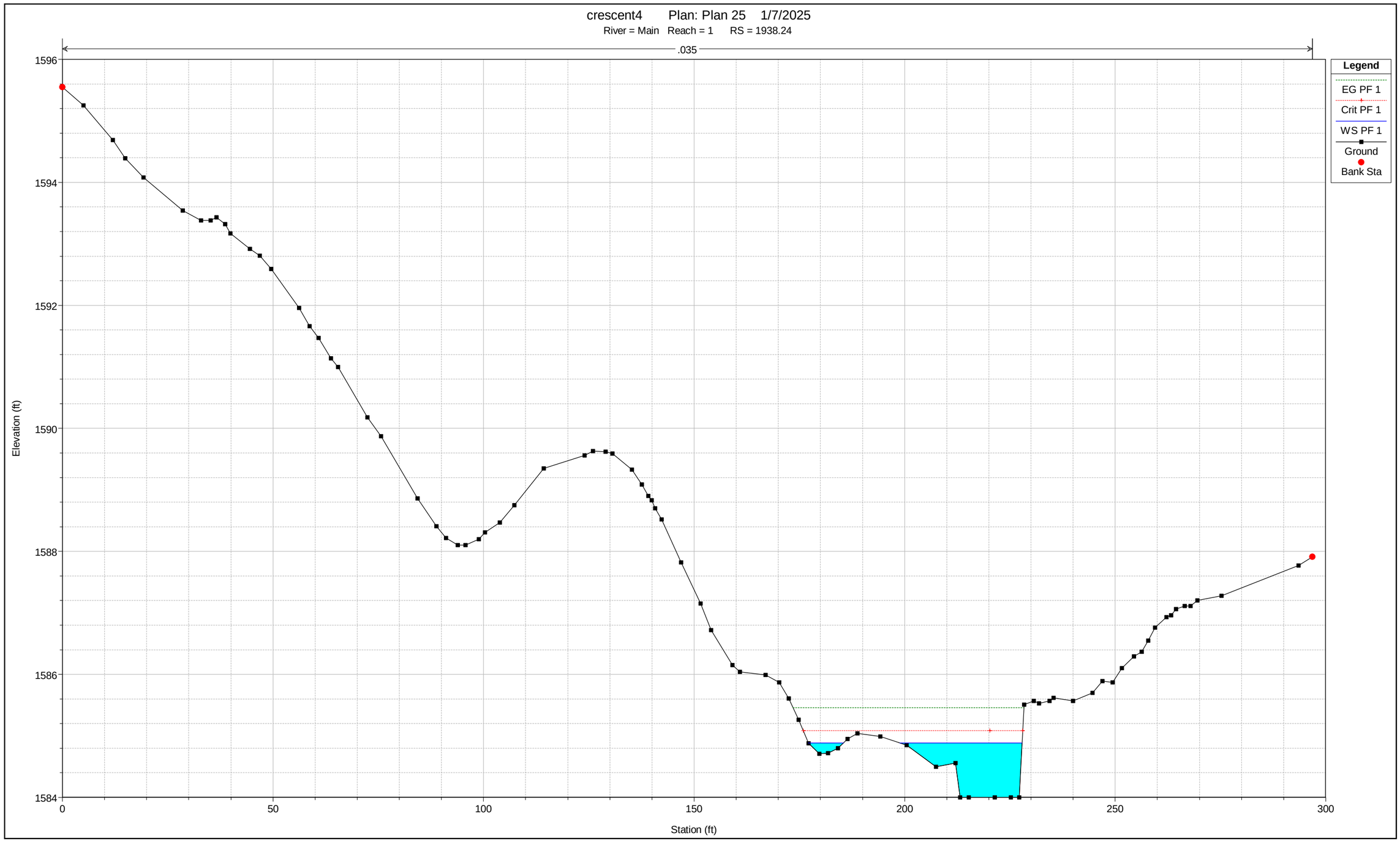


10-year Sections - Main Model



10-year Sections - Main Model



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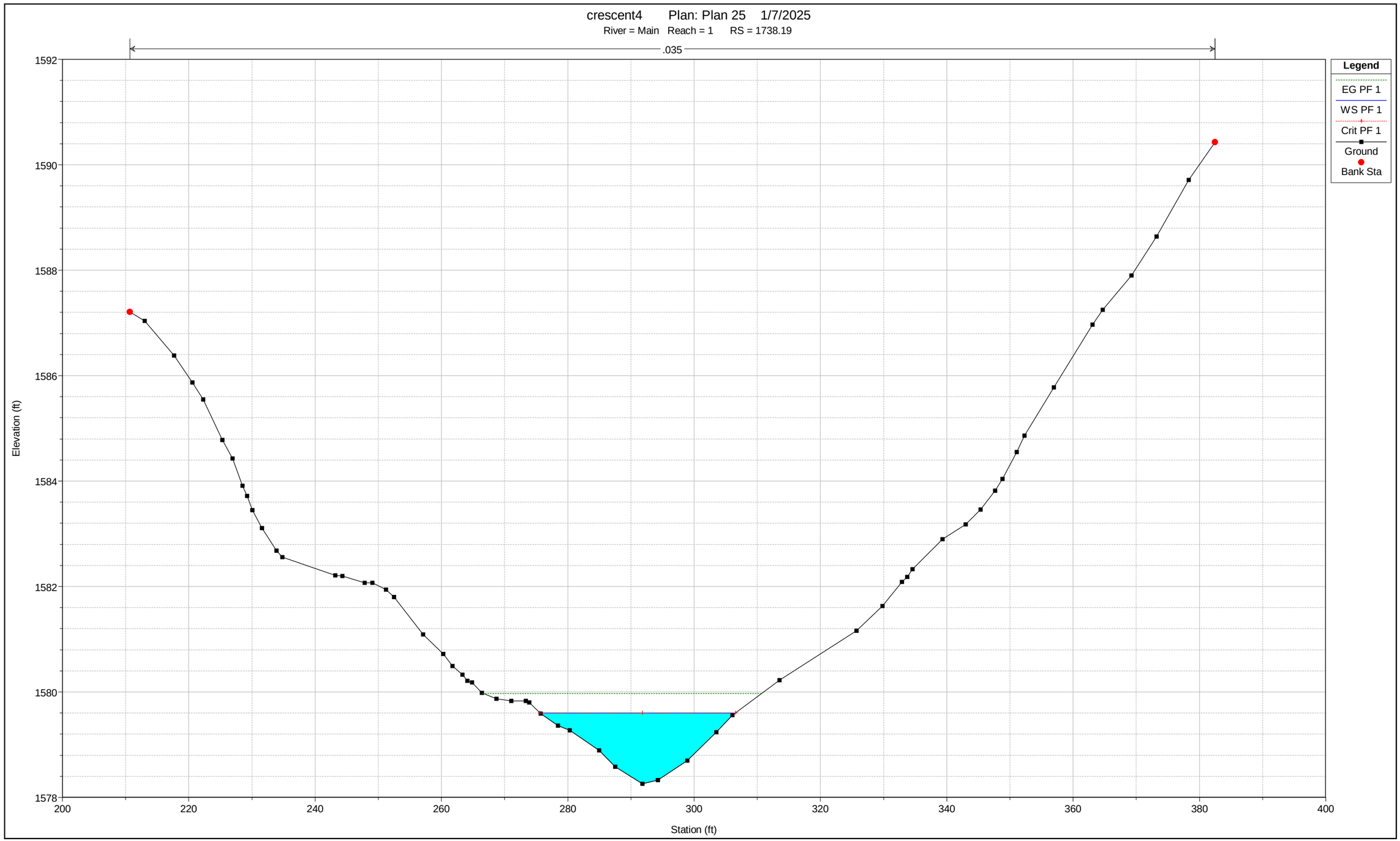

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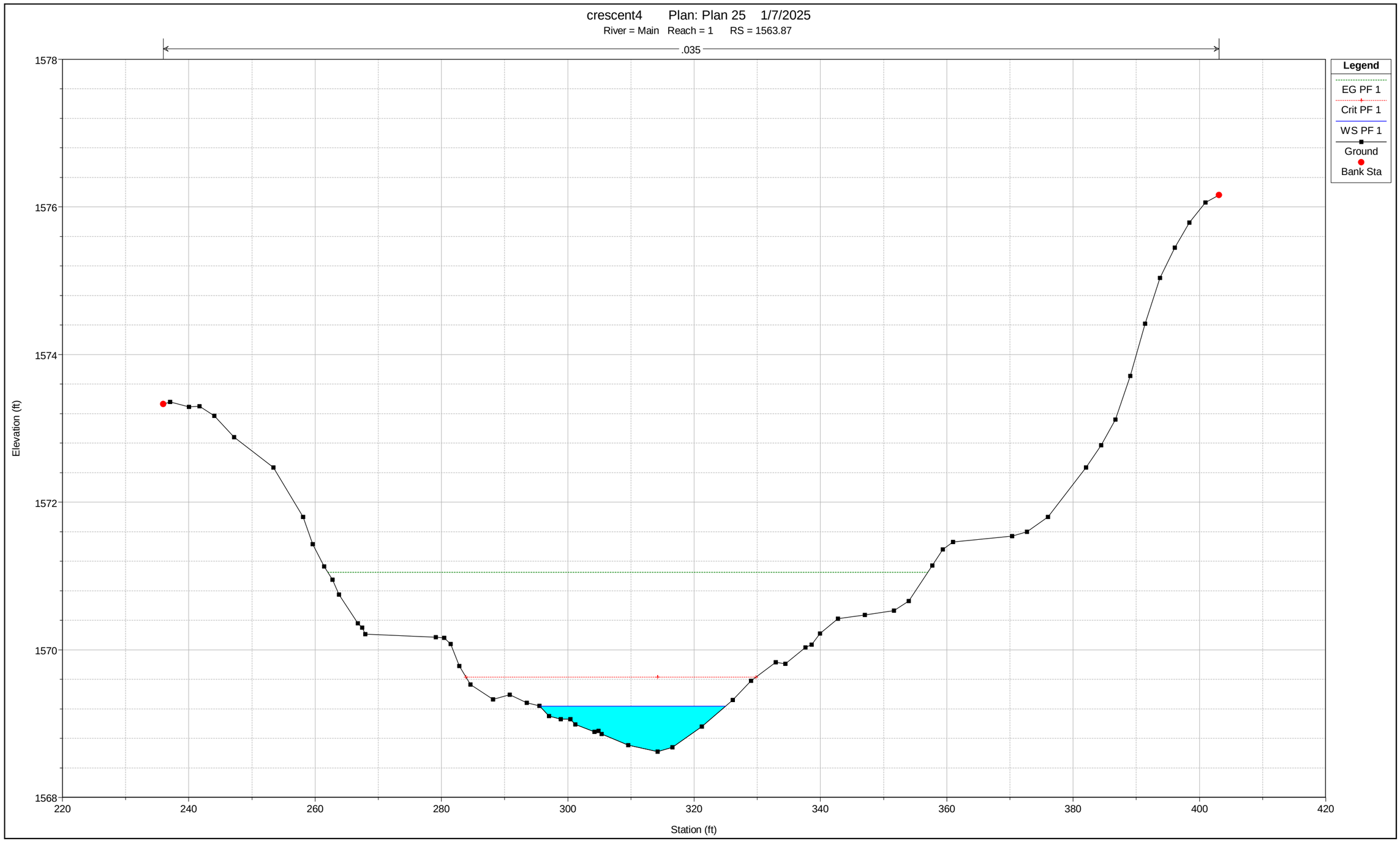

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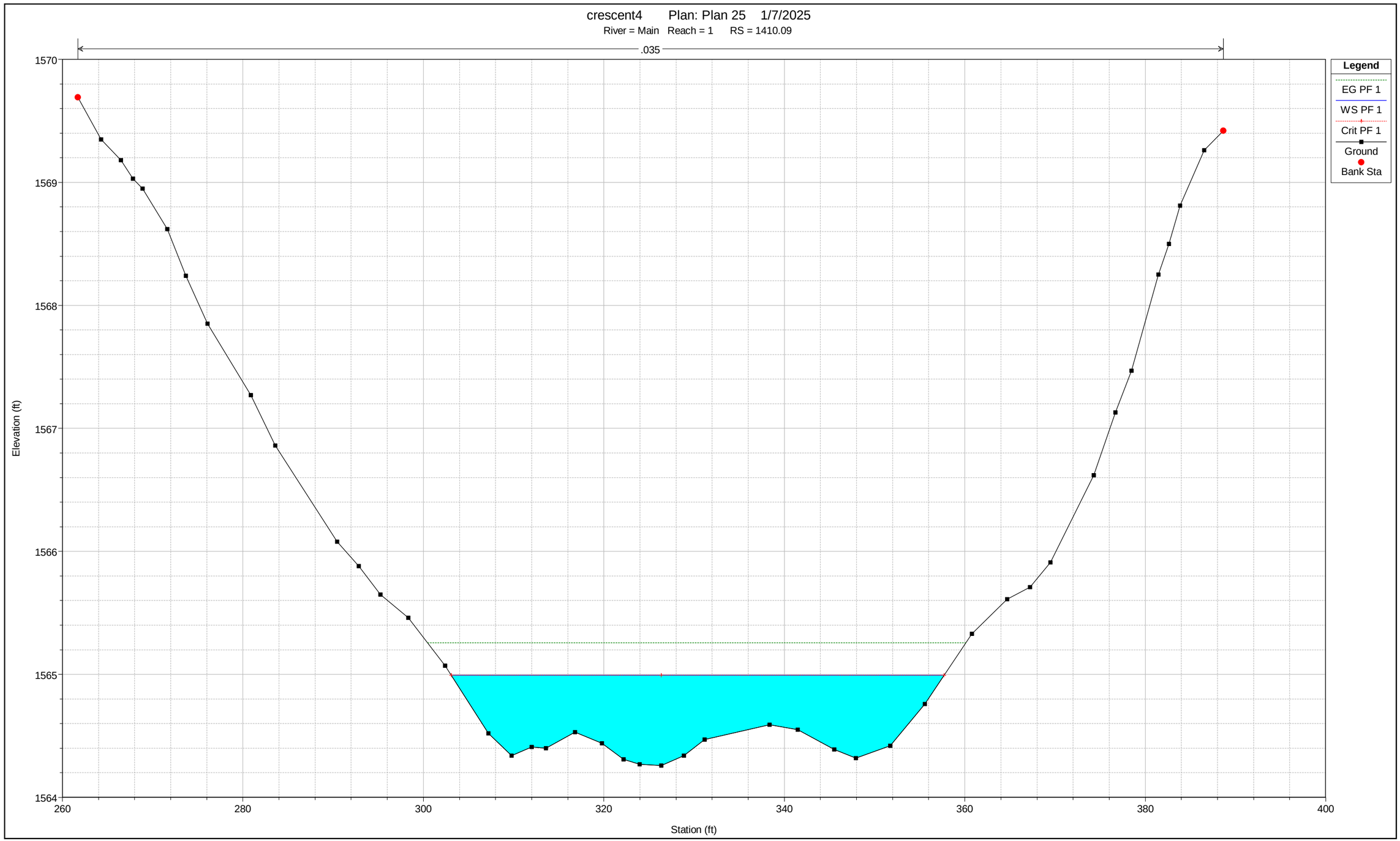
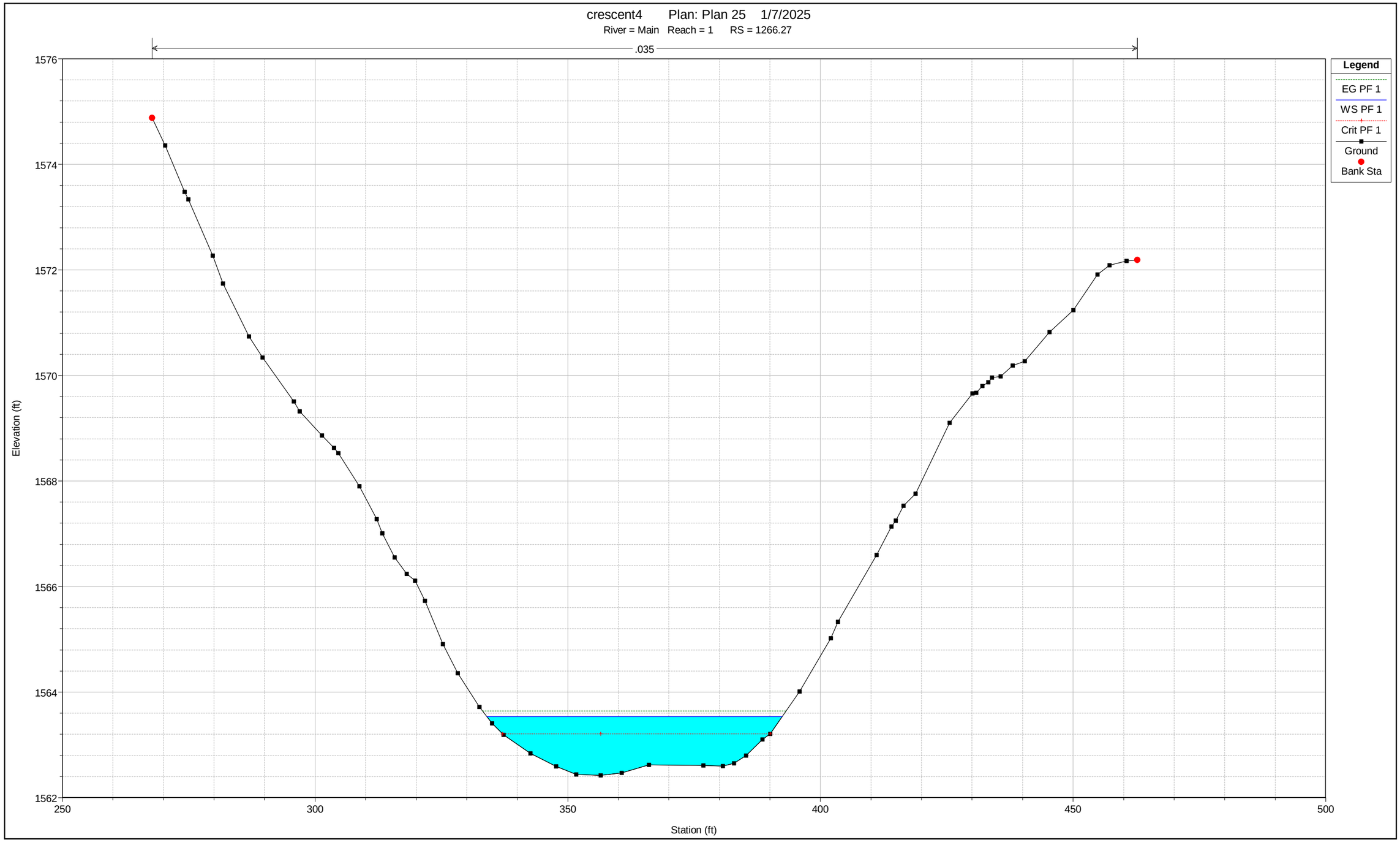


10-year Sections - Main Model



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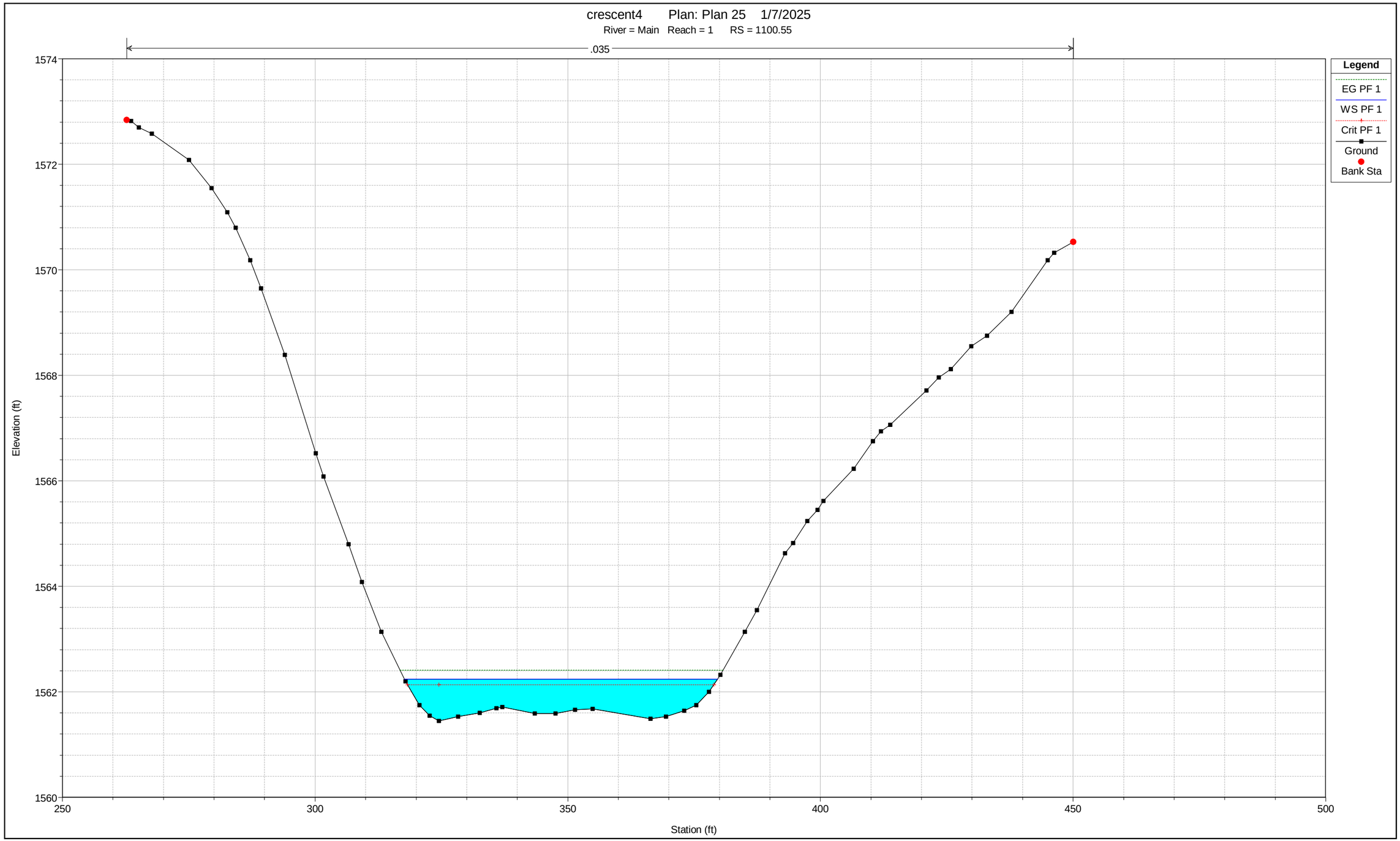

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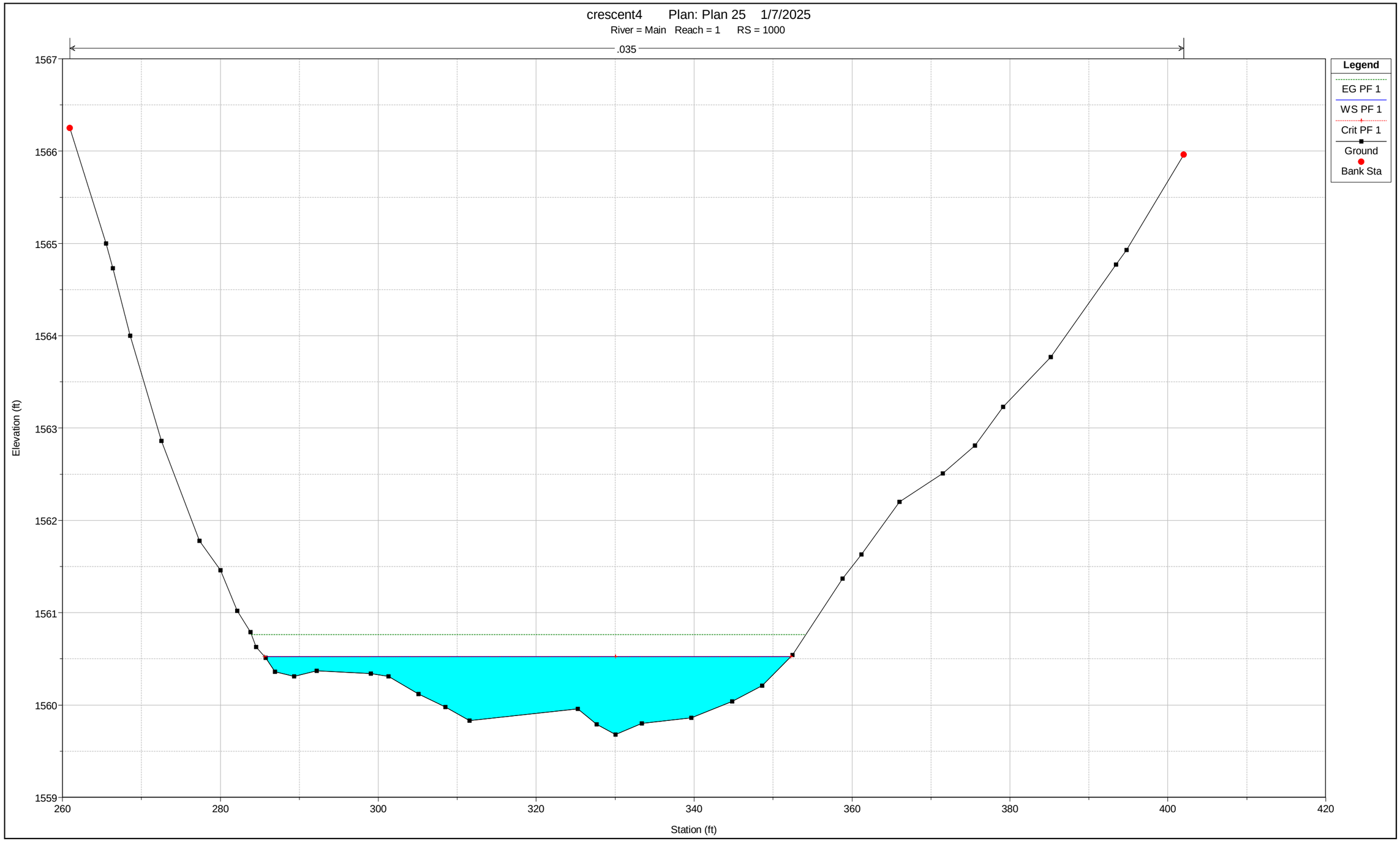

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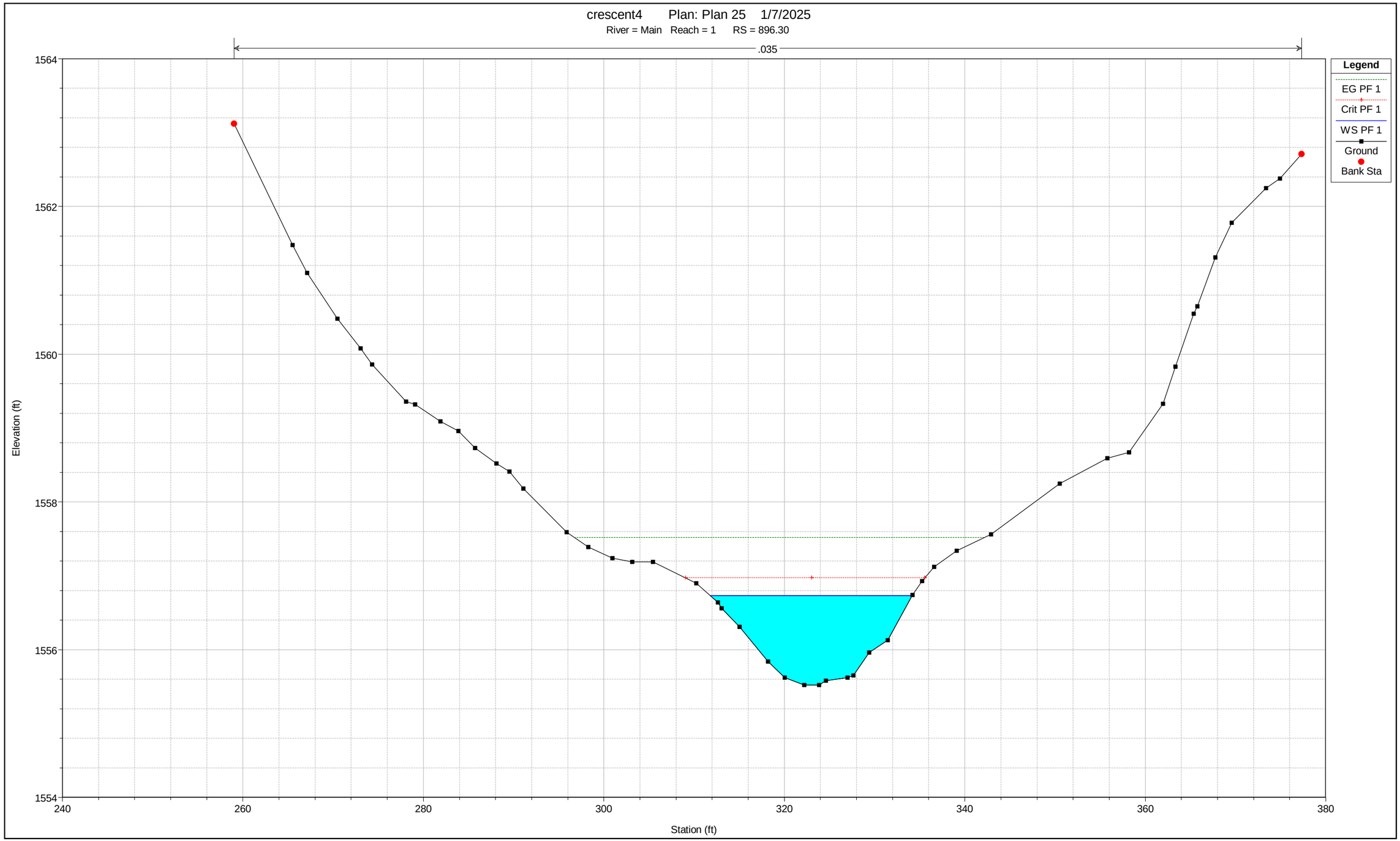

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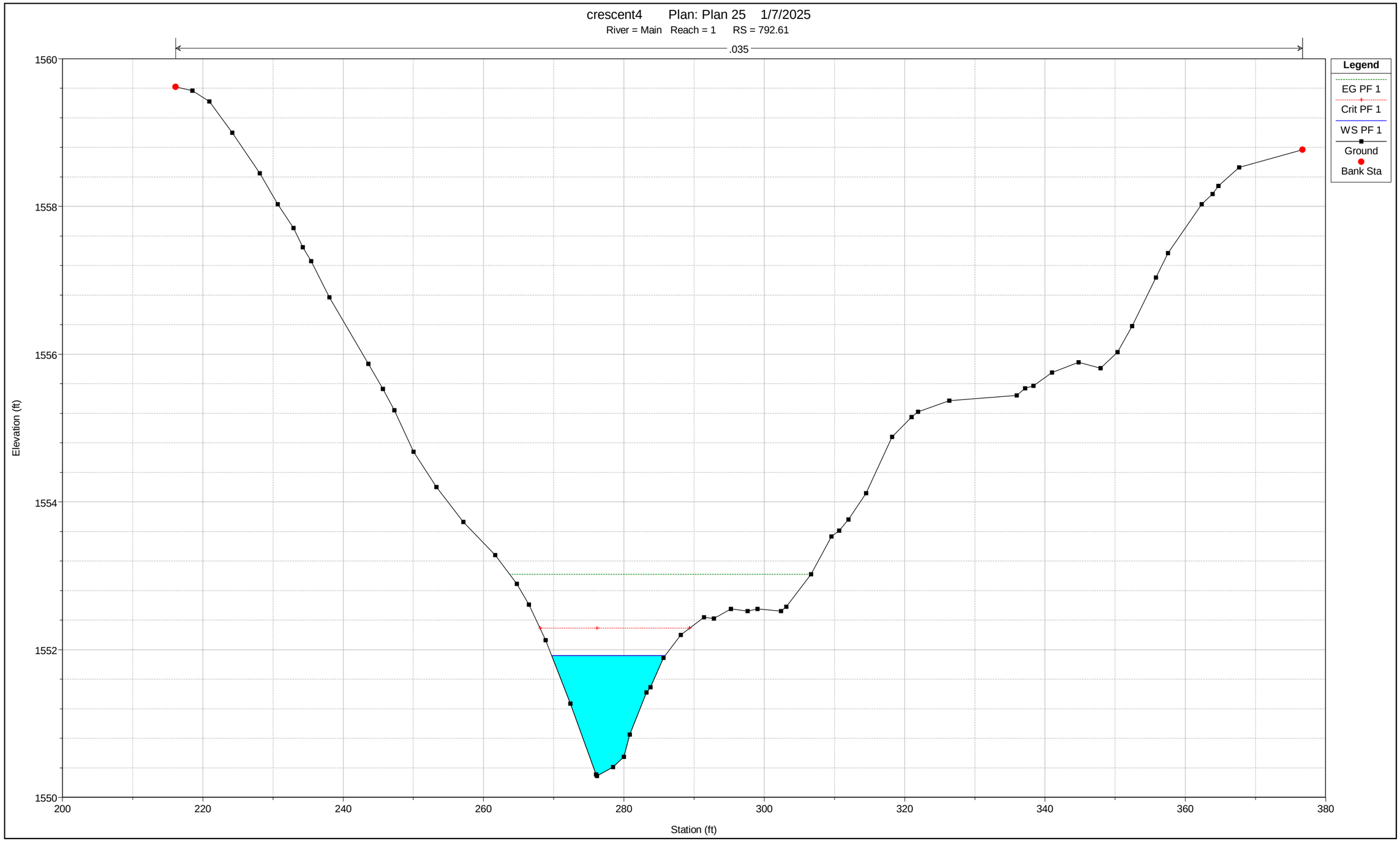
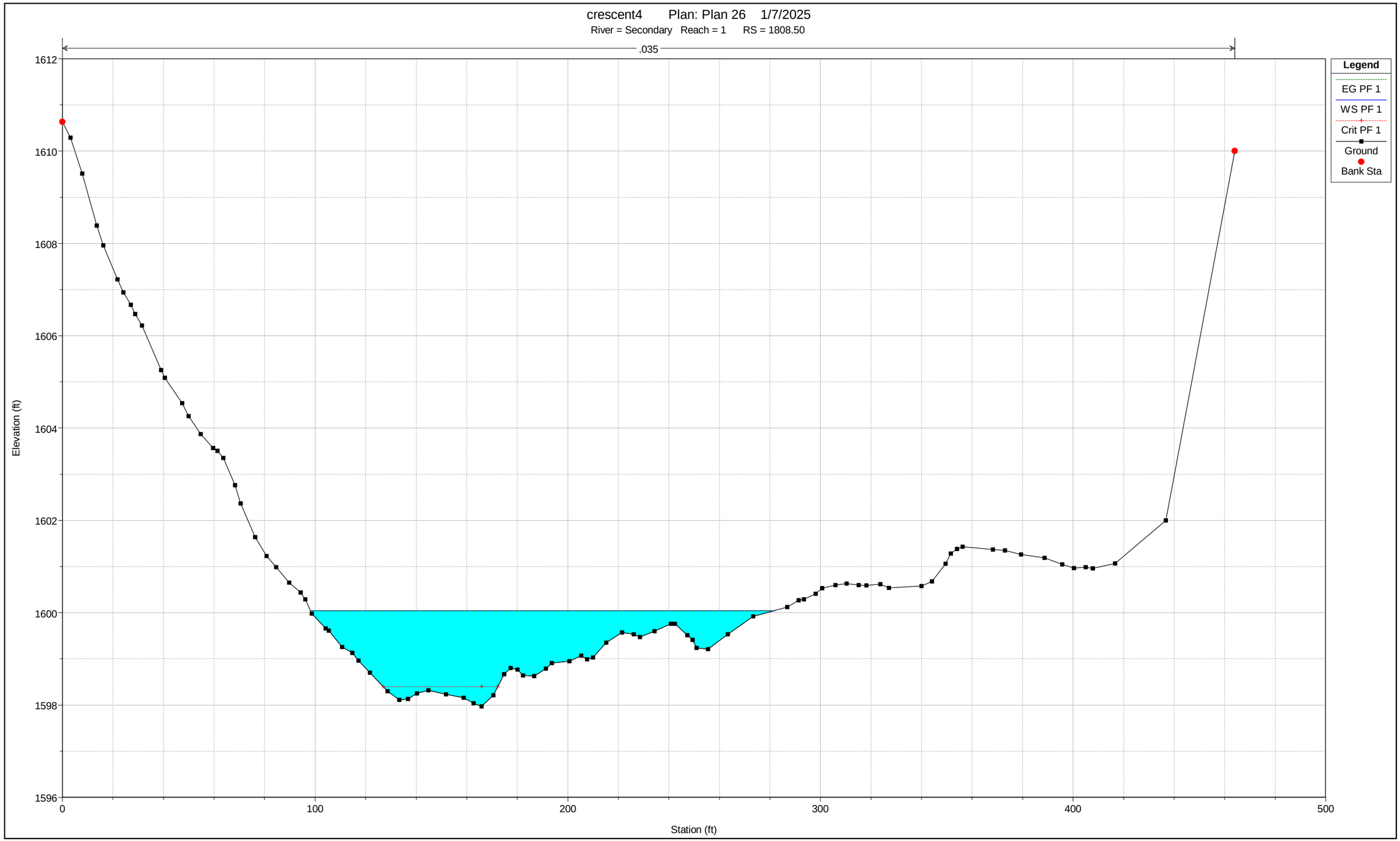


10-year Sections - Secondary Model



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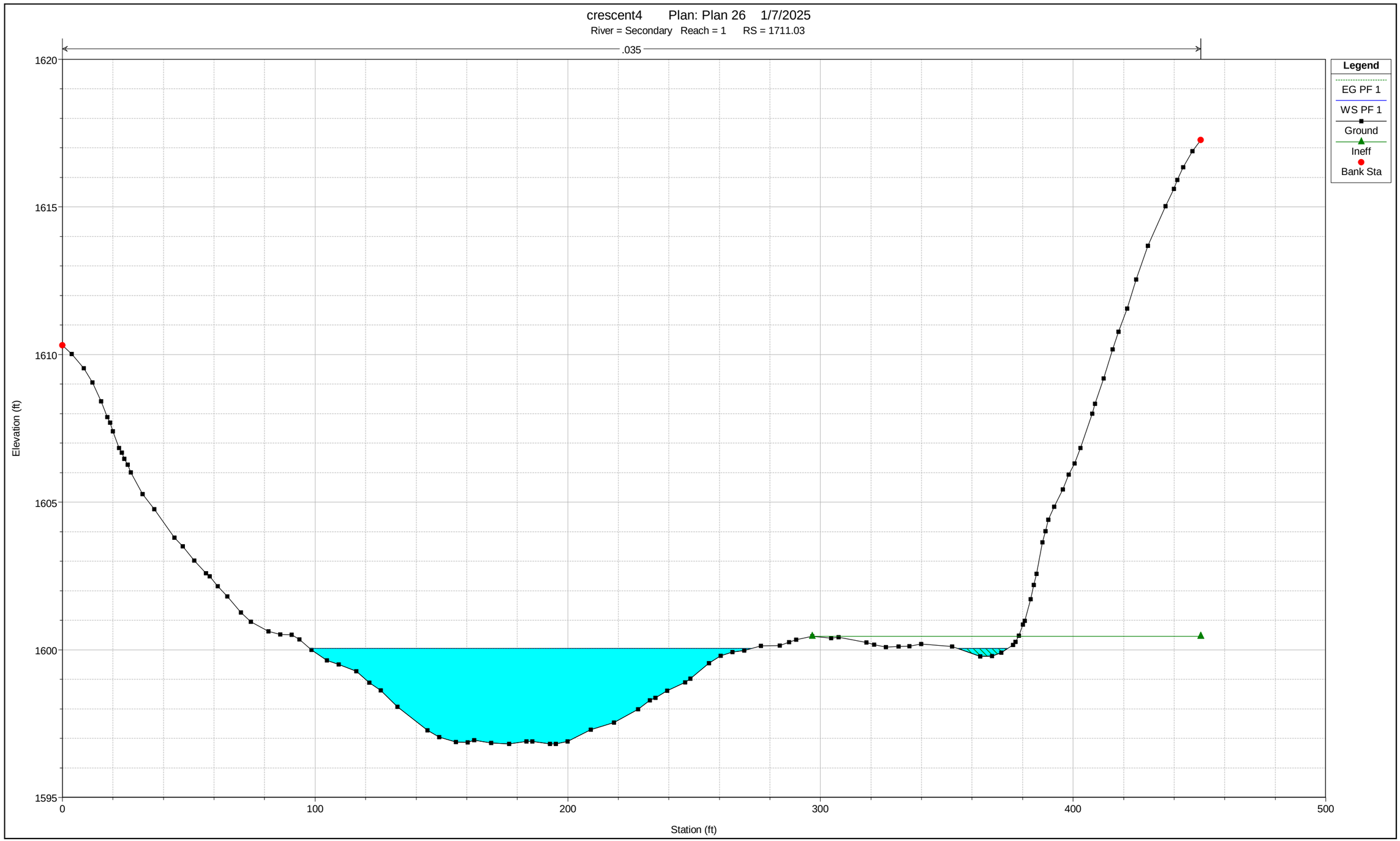

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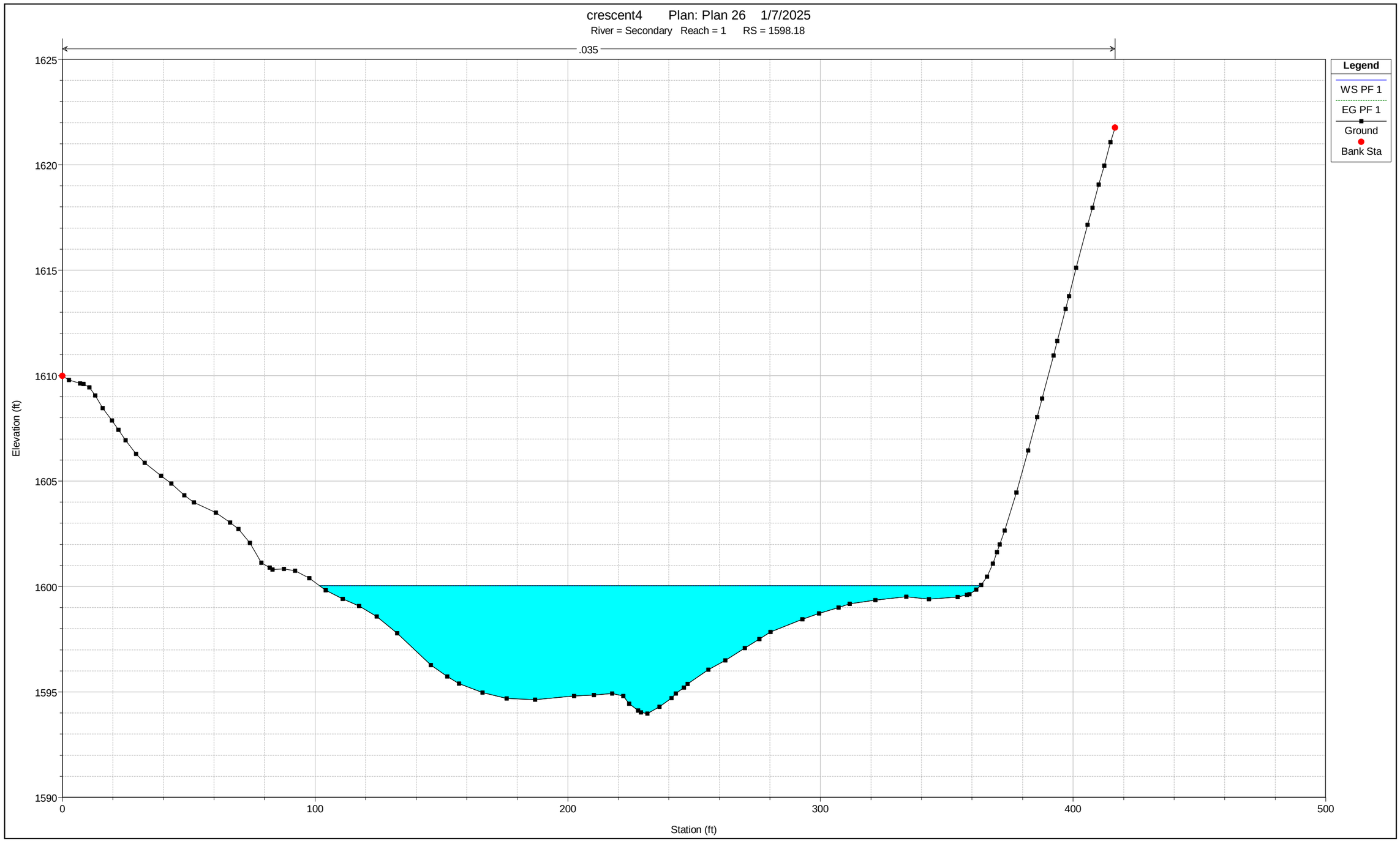

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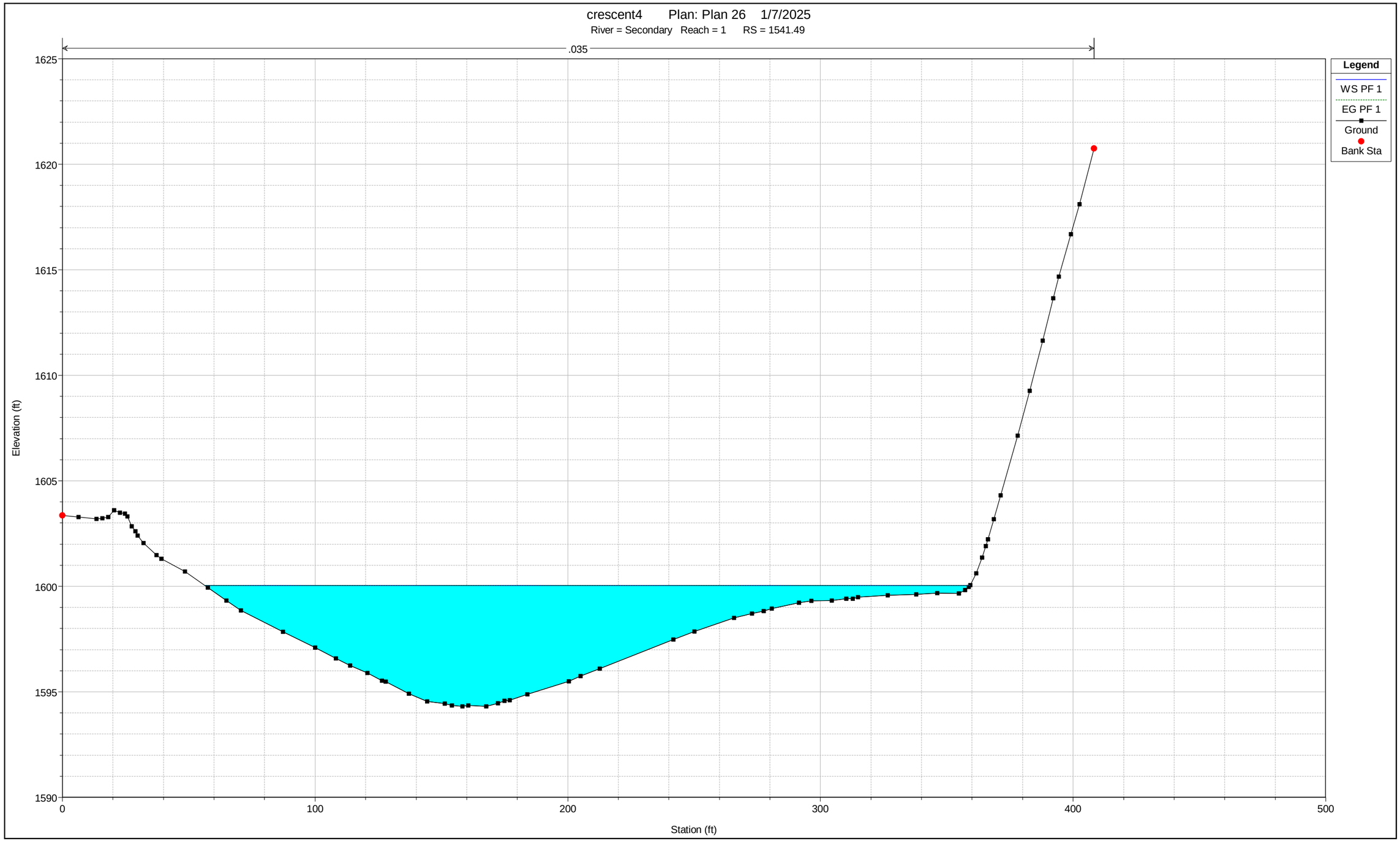
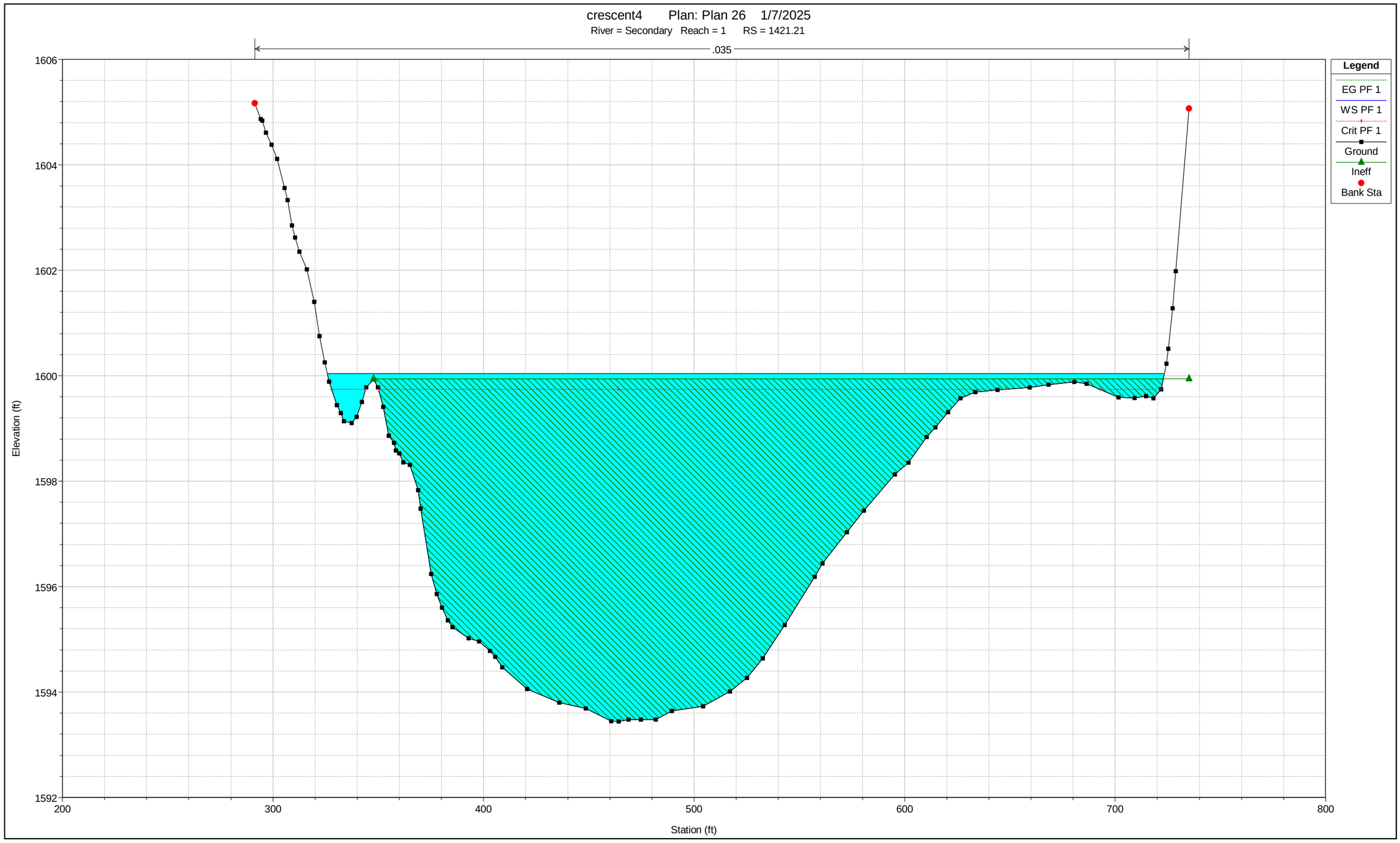


10-year Sections - Secondary Model



Plan: Plan 25 Main 1 RS: 2920.27 Profile: PF 1

E.G. Elev (ft)	1603.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	1603.21	Reach Len. (ft)	165.50	179.85	143.72
Crit W.S. (ft)	1603.21	Flow Area (sq ft)		17.67	
E.G. Slope (ft/ft)	0.021794	Area (sq ft)		17.67	
Q Total (cfs)	80.00	Flow (cfs)		80.00	
Top Width (ft)	28.69	Top Width (ft)		28.69	
Vel Total (ft/s)	4.53	Avg. Vel. (ft/s)		4.53	
Max Chl Dpth (ft)	1.04	Hydr. Depth (ft)		0.62	
Conv. Total (cfs)	541.9	Conv. (cfs)		541.9	
Length Wtd. (ft)	179.85	Wetted Per. (ft)		28.78	
Min Ch El (ft)	1602.17	Shear (lb/sq ft)		0.84	
Alpha	1.00	Stream Power (lb/ft s)		3.78	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		8.70	
C & E Loss (ft)	0.09	Cum SA (acres)		4.50	

Plan: Plan 25 Main 1 RS: 2740.42 Profile: PF 1

E.G. Elev (ft)	1602.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1602.55	Reach Len. (ft)	116.80	130.19	142.30
Crit W.S. (ft)	1600.98	Flow Area (sq ft)		142.88	
E.G. Slope (ft/ft)	0.000108	Area (sq ft)		142.88	
Q Total (cfs)	80.00	Flow (cfs)		80.00	
Top Width (ft)	99.81	Top Width (ft)		99.81	
Vel Total (ft/s)	0.56	Avg. Vel. (ft/s)		0.56	
Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	7688.3	Conv. (cfs)		7688.3	
Length Wtd. (ft)	130.19	Wetted Per. (ft)		100.13	
Min Ch El (ft)	1600.34	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		8.36	
C & E Loss (ft)	0.00	Cum SA (acres)		4.24	

Plan: Plan 25 Main 1 RS: 2610.23 Profile: PF 1

E.G. Elev (ft)	1602.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1602.52	Reach Len. (ft)	29.96	29.96	29.96
Crit W.S. (ft)	1600.47	Flow Area (sq ft)		108.02	
E.G. Slope (ft/ft)	0.000207	Area (sq ft)		108.02	
Q Total (cfs)	80.00	Flow (cfs)		80.00	
Top Width (ft)	79.81	Top Width (ft)		79.81	
Vel Total (ft/s)	0.74	Avg. Vel. (ft/s)		0.74	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	5563.7	Conv. (cfs)		5563.7	
Length Wtd. (ft)	29.96	Wetted Per. (ft)		80.84	
Min Ch El (ft)	1599.02	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)		Cum Volume (acre-ft)		7.99	
C & E Loss (ft)		Cum SA (acres)		3.97	

Plan: Plan 25 Main 1 RS: 2580.27 Profile: PF 1

E.G. Elev (ft)	1601.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.035	
W.S. Elev (ft)	1601.64	Reach Len. (ft)	60.80	103.80	151.30
Crit W.S. (ft)		Flow Area (sq ft)		25.38	
E.G. Slope (ft/ft)	0.007004	Area (sq ft)		25.38	
Q Total (cfs)	80.00	Flow (cfs)		80.00	
Top Width (ft)	26.97	Top Width (ft)		26.97	
Vel Total (ft/s)	3.15	Avg. Vel. (ft/s)		3.15	
Max Chl Dpth (ft)	2.85	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	955.9	Conv. (cfs)		955.9	
Length Wtd. (ft)	103.80	Wetted Per. (ft)		30.38	
Min Ch El (ft)	1598.79	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)		1.15	
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)		7.98	
C & E Loss (ft)	0.02	Cum SA (acres)		3.93	

Plan: Plan 25 Main 1 RS: 2481.34 Profile: PF 1

E.G. Elev (ft)	1600.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.04	Reach Len. (ft)	141.24	118.08	44.70
Crit W.S. (ft)	1600.04	Flow Area (sq ft)		49.06	
E.G. Slope (ft/ft)	0.042263	Area (sq ft)		1282.36	
Q Total (cfs)	106.00	Flow (cfs)		106.00	
Top Width (ft)	397.58	Top Width (ft)		397.58	
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)		2.16	
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)		0.12	
Conv. Total (cfs)	515.6	Conv. (cfs)		515.6	
Length Wtd. (ft)	118.08	Wetted Per. (ft)		398.29	
Min Ch El (ft)	1593.44	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		0.70	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		6.43	
C & E Loss (ft)	0.01	Cum SA (acres)		3.42	

Plan: Plan 25 Main 1 RS: 2363.27 Profile: PF 1

E.G. Elev (ft)	1597.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	1597.22	Reach Len. (ft)	168.50	164.14	157.00
Crit W.S. (ft)	1597.16	Flow Area (sq ft)		50.45	
E.G. Slope (ft/ft)	0.014299	Area (sq ft)		400.13	
Q Total (cfs)	106.00	Flow (cfs)		106.00	
Top Width (ft)	189.13	Top Width (ft)		189.13	
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)		2.10	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		0.27	
Conv. Total (cfs)	886.4	Conv. (cfs)		886.4	
Length Wtd. (ft)	164.14	Wetted Per. (ft)		189.52	
Min Ch El (ft)	1593.51	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		0.50	
Frctn Loss (ft)	3.34	Cum Volume (acre-ft)		4.14	
C & E Loss (ft)	0.00	Cum SA (acres)		2.63	

Plan: Plan 25 Main 1 RS: 2199.13 Profile: PF 1

E.G. Elev (ft)	1593.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	1593.85	Reach Len. (ft)	85.75	187.77	269.81
Crit W.S. (ft)	1593.85	Flow Area (sq ft)		41.54	
E.G. Slope (ft/ft)	0.031209	Area (sq ft)		624.87	
Q Total (cfs)	106.00	Flow (cfs)		106.00	
Top Width (ft)	208.45	Top Width (ft)		208.45	
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)		2.55	
Max Chl Dpth (ft)	5.15	Hydr. Depth (ft)		0.20	
Conv. Total (cfs)	600.0	Conv. (cfs)		600.0	
Length Wtd. (ft)	187.77	Wetted Per. (ft)		209.26	
Min Ch El (ft)	1588.70	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		0.99	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		2.21	
C & E Loss (ft)	0.00	Cum SA (acres)		1.88	

Plan: Plan 25 Main 1 RS: 2011.36 Profile: PF 1

E.G. Elev (ft)	1586.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	1586.59	Reach Len. (ft)	91.71	73.12	76.36
Crit W.S. (ft)	1585.50	Flow Area (sq ft)		75.12	
E.G. Slope (ft/ft)	0.001338	Area (sq ft)		75.12	
Q Total (cfs)	106.00	Flow (cfs)		106.00	
Top Width (ft)	86.37	Top Width (ft)		86.37	
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)		1.41	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		0.87	
Conv. Total (cfs)	2897.9	Conv. (cfs)		2897.9	
Length Wtd. (ft)	73.12	Wetted Per. (ft)		86.72	
Min Ch El (ft)	1584.50	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)		Cum Volume (acre-ft)		0.70	
C & E Loss (ft)		Cum SA (acres)		1.24	

Plan: Plan 25 Main 1 RS: 1938.24 Profile: PF 1

E.G. Elev (ft)	1585.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.035	
W.S. Elev (ft)	1584.89	Reach Len. (ft)	208.86	200.05	184.91
Crit W.S. (ft)	1585.09	Flow Area (sq ft)		17.49	
E.G. Slope (ft/ft)	0.060651	Area (sq ft)		17.49	
Q Total (cfs)	109.00	Flow (cfs)		106.00	
Top Width (ft)	37.40	Top Width (ft)		37.40	
Vel Total (ft/s)	6.06	Avg. Vel. (ft/s)		6.06	
Max Chl Dpth (ft)	0.89	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	442.6	Conv. (cfs)		442.6	
Length Wtd. (ft)	200.05	Wetted Per. (ft)		37.99	
Min Ch El (ft)	1584.00	Shear (lb/sq ft)		1.74	
Alpha	1.00	Stream Power (lb/ft s)		10.57	
Frctn Loss (ft)		Cum Volume (acre-ft)		0.68	
C & E Loss (ft)		Cum SA (acres)		1.14	

Plan: Plan 25 Main 1 RS: 1738.19 Profile: PF 1

E.G. Elev (ft)	1579.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	1579.60	Reach Len. (ft)	160.13	172.32	176.09
Crit W.S. (ft)	1579.60	Flow Area (sq ft)		22.35	
E.G. Slope (ft/ft)	0.020525	Area (sq ft)		22.35	
Q Total (cfs)	109.00	Flow (cfs)		109.00	
Top Width (ft)	30.99	Top Width (ft)		30.99	
Vel Total (ft/s)	4.88	Avg. Vel. (ft/s)		4.88	
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	760.8	Conv. (cfs)		760.8	
Length Wtd. (ft)	172.32	Wetted Per. (ft)		31.12	
Min Ch El (ft)	1578.26	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)		4.49	
Frctn Loss (ft)	8.78	Cum Volume (acre-ft)		0.59	
C & E Loss (ft)	0.14	Cum SA (acres)		0.98	

Plan: Plan 25 Main 1 RS: 1563.87 Profile: PF 1

E.G. Elev (ft)	1571.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.81	Wt. n-Val.		0.035	
W.S. Elev (ft)	1569.23	Reach Len. (ft)	138.76	153.78	158.76
Crit W.S. (ft)	1569.63	Flow Area (sq ft)		10.46	
E.G. Slope (ft/ft)	0.257707	Area (sq ft)		10.46	
Q Total (cfs)	113.00	Flow (cfs)		113.00	
Top Width (ft)	29.41	Top Width (ft)		29.41	
Vel Total (ft/s)	10.81	Avg. Vel. (ft/s)		10.81	
Max Chl Dpth (ft)	0.61	Hydr. Depth (ft)		0.36	
Conv. Total (cfs)	222.6	Conv. (cfs)		222.6	
Length Wtd. (ft)	153.78	Wetted Per. (ft)		29.45	
Min Ch El (ft)	1568.62	Shear (lb/sq ft)		5.71	
Alpha	1.00	Stream Power (lb/ft s)		61.73	
Frctn Loss (ft)	3.46	Cum Volume (acre-ft)		0.53	
C & E Loss (ft)	0.01	Cum SA (acres)		0.86	

Plan: Plan 25 Main 1 RS: 1410.09 Profile: PF 1

E.G. Elev (ft)	1565.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	1564.99	Reach Len. (ft)	143.82	143.82	143.82
Crit W.S. (ft)	1564.99	Flow Area (sq ft)		28.01	
E.G. Slope (ft/ft)	0.022846	Area (sq ft)		28.01	
Q Total (cfs)	115.00	Flow (cfs)		115.00	
Top Width (ft)	54.63	Top Width (ft)		54.63	
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)		4.11	
Max Chl Dpth (ft)	0.73	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	760.8	Conv. (cfs)		760.8	
Length Wtd. (ft)	143.82	Wetted Per. (ft)		54.71	
Min Ch El (ft)	1564.26	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		3.00	
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)		0.46	
C & E Loss (ft)	0.05	Cum SA (acres)		0.72	

Plan: Plan 25 Main 1 RS: 1266.27 Profile: PF 1

E.G. Elev (ft)	1563.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	1563.54	Reach Len. (ft)	165.72	165.72	165.72
Crit W.S. (ft)	1563.21	Flow Area (sq ft)		47.29	
E.G. Slope (ft/ft)	0.004992	Area (sq ft)		47.29	
Q Total (cfs)	123.00	Flow (cfs)		123.00	
Top Width (ft)	58.47	Top Width (ft)		58.47	
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.60	
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	1740.8	Conv. (cfs)		1740.8	
Length Wtd. (ft)	165.72	Wetted Per. (ft)		58.56	
Min Ch El (ft)	1562.42	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.65	
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)		0.34	
C & E Loss (ft)	0.01	Cum SA (acres)		0.53	

Plan: Plan 25 Main 1 RS: 1100.55 Profile: PF 1

E.G. Elev (ft)	1562.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	1562.24	Reach Len. (ft)	100.55	100.55	100.55
Crit W.S. (ft)	1562.14	Flow Area (sq ft)		36.95	
E.G. Slope (ft/ft)	0.012281	Area (sq ft)		36.95	
Q Total (cfs)	123.00	Flow (cfs)		123.00	
Top Width (ft)	61.98	Top Width (ft)		61.98	
Vel Total (ft/s)	3.33	Avg. Vel. (ft/s)		3.33	
Max Chl Dpth (ft)	0.79	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	1109.9	Conv. (cfs)		1109.9	
Length Wtd. (ft)	100.55	Wetted Per. (ft)		62.08	
Min Ch El (ft)	1561.45	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)		1.52	
Frctn Loss (ft)	1.65	Cum Volume (acre-ft)		0.18	
C & E Loss (ft)	0.01	Cum SA (acres)		0.30	

Plan: Plan 25 Main 1 RS: 1000 Profile: PF 1

E.G. Elev (ft)	1560.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	1560.53	Reach Len. (ft)	103.70	103.70	103.70
Crit W.S. (ft)	1560.53	Flow Area (sq ft)		31.56	
E.G. Slope (ft/ft)	0.022877	Area (sq ft)		31.56	
Q Total (cfs)	123.00	Flow (cfs)		123.00	
Top Width (ft)	66.68	Top Width (ft)		66.68	
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)		3.90	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	813.2	Conv. (cfs)		813.2	
Length Wtd. (ft)	103.70	Wetted Per. (ft)		66.74	
Min Ch El (ft)	1559.68	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)		2.63	
Frctn Loss (ft)	3.19	Cum Volume (acre-ft)		0.10	
C & E Loss (ft)	0.05	Cum SA (acres)		0.15	

Plan: Plan 25 Main 1 RS: 896.30 Profile: PF 1

E.G. Elev (ft)	1557.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.035	
W.S. Elev (ft)	1556.73	Reach Len. (ft)	103.69	103.69	103.69
Crit W.S. (ft)	1556.97	Flow Area (sq ft)		17.29	
E.G. Slope (ft/ft)	0.040015	Area (sq ft)		17.29	
Q Total (cfs)	123.00	Flow (cfs)		123.00	
Top Width (ft)	22.37	Top Width (ft)		22.37	
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.11	
Max Chl Dpth (ft)	1.21	Hydr. Depth (ft)		0.77	
Conv. Total (cfs)	614.9	Conv. (cfs)		614.9	
Length Wtd. (ft)	103.69	Wetted Per. (ft)		22.55	
Min Ch El (ft)	1555.52	Shear (lb/sq ft)		1.92	
Alpha	1.00	Stream Power (lb/ft s)		13.62	
Frctn Loss (ft)	4.47	Cum Volume (acre-ft)		0.04	
C & E Loss (ft)	0.03	Cum SA (acres)		0.05	

Plan: Plan 25 Main 1 RS: 792.61 Profile: PF 1

E.G. Elev (ft)	1553.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	1551.92	Reach Len. (ft)			
Crit W.S. (ft)	1552.29	Flow Area (sq ft)		14.59	
E.G. Slope (ft/ft)	0.046493	Area (sq ft)		14.59	
Q Total (cfs)	123.00	Flow (cfs)		123.00	
Top Width (ft)	16.13	Top Width (ft)		16.13	
Vel Total (ft/s)	8.43	Avg. Vel. (ft/s)		8.43	
Max Chl Dpth (ft)	1.63	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	570.4	Conv. (cfs)		570.4	
Length Wtd. (ft)		Wetted Per. (ft)		16.51	
Min Ch El (ft)	1550.29	Shear (lb/sq ft)		2.56	
Alpha	1.00	Stream Power (lb/ft s)		21.62	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Plan 25 Main 1 RS: 2609.73 Culv Group: Culvert #1 Profile: PF 1

Q Culv Group (cfs)	80.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	6.03
Q Barrel (cfs)	40.00	Culv Vel DS (ft/s)	5.77
E.G. US. (ft)	1602.53	Culv Inv El Up (ft)	1599.02
W.S. US. (ft)	1602.52	Culv Inv El Dn (ft)	1598.79
E.G. DS (ft)	1601.79	Culv Frctn Ls (ft)	0.09
W.S. DS (ft)	1601.64	Culv Exit Loss (ft)	0.36
Delta EG (ft)	0.74	Culv Entr Loss (ft)	0.28
Delta WS (ft)	0.88	Q Weir (cfs)	
E.G. IC (ft)	1602.31	Weir Sta Lft (ft)	
E.G. OC (ft)	1602.53	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1601.68	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1601.64	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.81	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.06	Min El Weir Flow (ft)	1602.75

Plan: Plan 25 Main 1 RS: 1981.43 Culv Group: Culvert #1 Profile: PF 1

Q Culv Group (cfs)	106.00	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	6.25
Q Barrel (cfs)	106.00	Culv Vel DS (ft/s)	8.58
E.G. US. (ft)	1586.62	Culv Inv El Up (ft)	1584.50
W.S. US. (ft)	1586.59	Culv Inv El Dn (ft)	1584.00
E.G. DS (ft)	1585.35	Culv Frctn Ls (ft)	0.29
W.S. DS (ft)	1585.08	Culv Exit Loss (ft)	0.68
Delta EG (ft)	1.27	Culv Entr Loss (ft)	0.30
Delta WS (ft)	1.51	Q Weir (cfs)	
E.G. IC (ft)	1586.45	Weir Sta Lft (ft)	
E.G. OC (ft)	1586.62	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1585.71	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1584.88	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	0.80	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.21	Min El Weir Flow (ft)	1587.98

Plan: Plan 26 Secondary 1 RS: 1808.50 Profile: PF 1

E.G. Elev (ft)	1600.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.05	Reach Len. (ft)	94.85	97.47	80.28
Crit W.S. (ft)	1598.40	Flow Area (sq ft)		189.04	
E.G. Slope (ft/ft)	0.000009	Area (sq ft)		189.04	
Q Total (cfs)	25.00	Flow (cfs)		25.00	
Top Width (ft)	183.61	Top Width (ft)		183.61	
Vel Total (ft/s)	0.13	Avg. Vel. (ft/s)		0.13	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		1.03	
Conv. Total (cfs)	8178.5	Conv. (cfs)		8178.5	
Length Wtd. (ft)	97.47	Wetted Per. (ft)		183.77	
Min Ch El (ft)	1597.97	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		6.03	
C & E Loss (ft)	0.00	Cum SA (acres)		2.35	

Plan: Plan 26 Secondary 1 RS: 1711.03 Profile: PF 1

E.G. Elev (ft)	1600.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.04	Reach Len. (ft)	107.56	112.85	120.66
Crit W.S. (ft)		Flow Area (sq ft)		346.22	
E.G. Slope (ft/ft)	0.000001	Area (sq ft)		349.52	
Q Total (cfs)	25.00	Flow (cfs)		25.00	
Top Width (ft)	194.75	Top Width (ft)		194.75	
Vel Total (ft/s)	0.07	Avg. Vel. (ft/s)		0.07	
Max Chl Dpth (ft)	3.23	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	23152.5	Conv. (cfs)		23152.5	
Length Wtd. (ft)	112.85	Wetted Per. (ft)		175.13	
Min Ch El (ft)	1596.81	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		5.43	
C & E Loss (ft)	0.00	Cum SA (acres)		1.93	

Plan: Plan 26 Secondary 1 RS: 1598.18 Profile: PF 1

E.G. Elev (ft)	1600.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.04	Reach Len. (ft)	72.10	56.69	24.86
Crit W.S. (ft)		Flow Area (sq ft)		789.23	
E.G. Slope (ft/ft)	0.000000	Area (sq ft)		789.23	
Q Total (cfs)	25.00	Flow (cfs)		25.00	
Top Width (ft)	261.71	Top Width (ft)		261.71	
Vel Total (ft/s)	0.03	Avg. Vel. (ft/s)		0.03	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	69852.9	Conv. (cfs)		69852.9	
Length Wtd. (ft)	56.69	Wetted Per. (ft)		262.19	
Min Ch El (ft)	1593.98	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.95	
C & E Loss (ft)	0.00	Cum SA (acres)		1.33	

Plan: Plan 26 Secondary 1 RS: 1541.49 Profile: PF 1

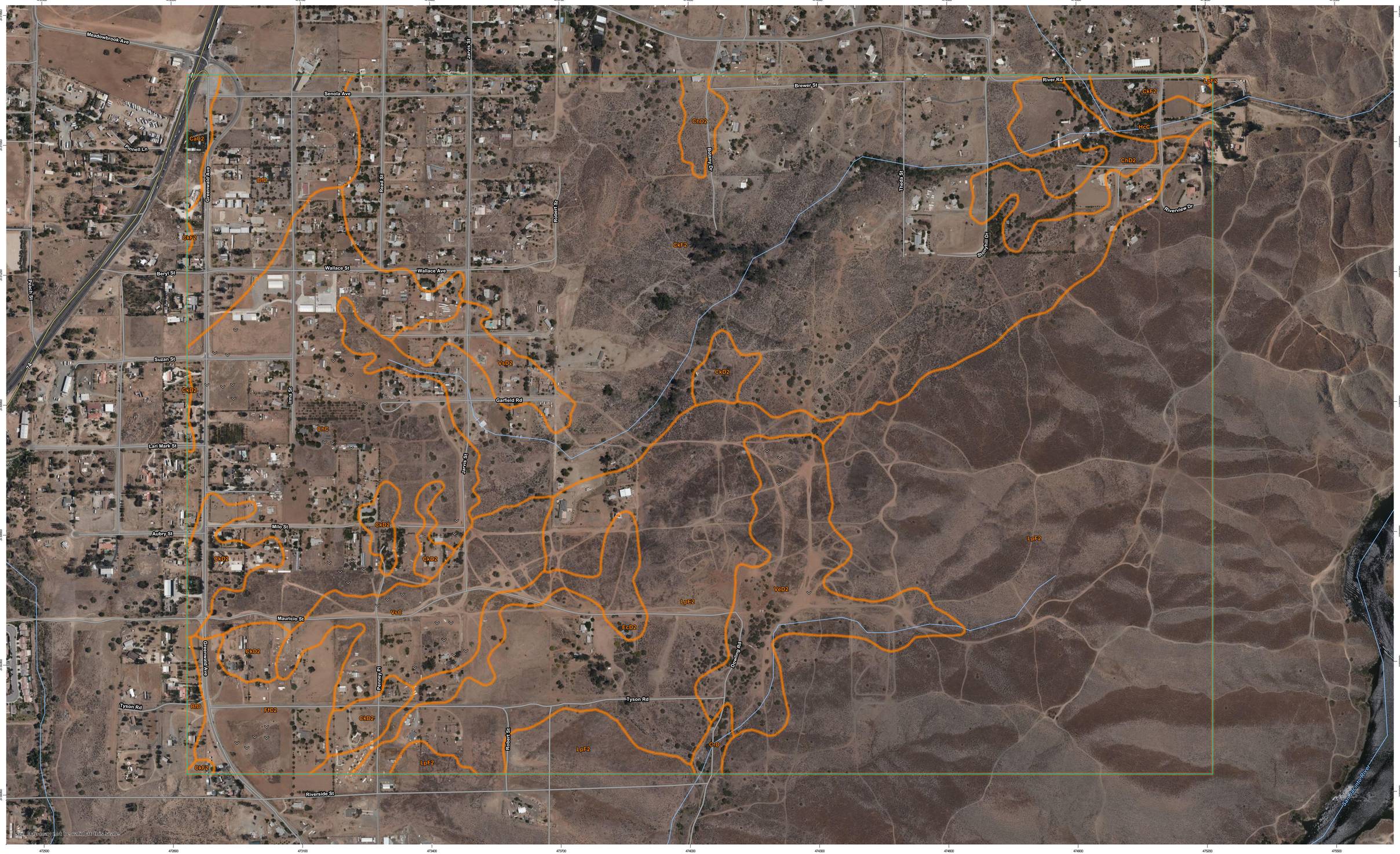
E.G. Elev (ft)	1600.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.04	Reach Len. (ft)	129.05	120.28	40.52
Crit W.S. (ft)		Flow Area (sq ft)		819.46	
E.G. Slope (ft/ft)	0.000000	Area (sq ft)		819.46	
Q Total (cfs)	25.00	Flow (cfs)		25.00	
Top Width (ft)	302.97	Top Width (ft)		302.97	
Vel Total (ft/s)	0.03	Avg. Vel. (ft/s)		0.03	
Max Chl Dpth (ft)	5.73	Hydr. Depth (ft)		2.70	
Conv. Total (cfs)	67492.0	Conv. (cfs)		67492.0	
Length Wtd. (ft)	120.28	Wetted Per. (ft)		303.27	
Min Ch El (ft)	1594.31	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.90	
C & E Loss (ft)	0.00	Cum SA (acres)		0.97	

Plan: Plan 26 Secondary 1 RS: 1421.21 Profile: PF 1

E.G. Elev (ft)	1600.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1600.04	Reach Len. (ft)			
Crit W.S. (ft)	1599.74	Flow Area (sq ft)		50.18	
E.G. Slope (ft/ft)	0.002181	Area (sq ft)		1283.47	
Q Total (cfs)	25.00	Flow (cfs)		25.00	
Top Width (ft)	397.61	Top Width (ft)		397.61	
Vel Total (ft/s)	0.50	Avg. Vel. (ft/s)		0.50	
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)		0.13	
Conv. Total (cfs)	535.3	Conv. (cfs)		535.3	
Length Wtd. (ft)		Wetted Per. (ft)		398.32	
Min Ch El (ft)	1593.44	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SECTION 6
REFERENCES

HYDROLOGIC SOILS GROUP MAP
(NRCS MAP)



Map Scale: 1:4,010 if printed on D landscape (34" x 22") sheet.

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BfD	Bosanko clay, 9 to 15 percent slopes	38.7	4.1%
CaC2	Cajalco fine sandy loam, 2 to 8 percent slopes, eroded	3.8	0.4%
ChC	Cieneba sandy loam, 5 to 8 percent slopes	102.7	10.8%
ChD2	Cieneba sandy loam, 8 to 15 percent slopes, eroded	21.4	2.2%
CkD2	Cieneba rocky sandy loam, 8 to 15 percent slopes, eroded	26.9	2.8%
CkF2	Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded	296.8	31.2%
CrD	Cortina cobbly sandy loam, 2 to 12 percent slopes	2.2	0.2%
EcD2	Escondido fine sandy loam, 8 to 15 percent slopes, eroded	14.5	1.5%
FfC2	Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded	20.4	2.1%
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes	5.3	0.6%
LpE2	Lodo rocky loam, 8 to 25 percent slopes, eroded	85.1	9.0%
LpF2	Lodo rocky loam, 25 to 50 percent slopes, eroded	255.2	26.8%
VeD2	Vallecitos loam, thick solum variant, 8 to 15 percent slopes, eroded	37.8	4.0%
VsC	Vista coarse sandy loam, 2 to 8 percent slopes	29.7	3.1%
VsD2	Vista coarse sandy loam, 8 to 15 percent slopes, eroded	10.1	1.1%
Totals for Area of Interest		**950.8**	**100.0%**

Western Riverside Area, California

BfD—Bosanko clay, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2xm61
Elevation: 100 to 2,040 feet
Mean annual precipitation: 9 to 16 inches
Mean annual air temperature: 63 to 65 degrees F
Frost-free period: 321 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Bosanko and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bosanko

Setting

Landform: Hillslopes, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from granite

Typical profile

Ap - 0 to 5 inches: clay
Bss - 5 to 25 inches: clay
Bk - 25 to 37 inches: clay
Cr - 37 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 26 to 38 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R019XD001CA - CLAYEY (1975)

Hydric soil rating: No

Minor Components

Vista

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Bonsall

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Fallbrook

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Alo

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Balcom

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

CaC2—Cajalco fine sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcry
Elevation: 900 to 3,500 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cajalco and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cajalco

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from gabbro

Typical profile

H1 - 0 to 13 inches: fine sandy loam
H2 - 13 to 30 inches: loam
H3 - 30 to 62 inches: weathered bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY

Hydric soil rating: No

Minor Components

Las posas
Percent of map unit: 5 percent
Hydric soil rating: No

Honcut
Percent of map unit: 5 percent
Hydric soil rating: No

Wyman
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

ChC—Cieneba sandy loam, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcs9
Elevation: 500 to 4,000 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Cieneba and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cieneba

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 22 inches: weathered bedrock

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

Fallbrook
Percent of map unit: 5 percent
Hydric soil rating: No

Vista
Percent of map unit: 5 percent
Hydric soil rating: No

Friant
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

ChD2—Cieneba sandy loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcsb
Elevation: 500 to 4,000 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Cieneba and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cieneba

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 22 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

Friant
Percent of map unit: 5 percent
Hydric soil rating: No

Vista
Percent of map unit: 5 percent
Hydric soil rating: No

Fallbrook
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

CkD2—Cieneba rocky sandy loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcsd
Elevation: 500 to 4,000 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Cieneba and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cieneba

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 22 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

Rock outcrop
Percent of map unit: 10 percent
Hydric soil rating: No

Friant
Percent of map unit: 5 percent
Hydric soil rating: No

Fallbrook
Percent of map unit: 5 percent
Hydric soil rating: No

Vista
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

CkF2—Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcsf
Elevation: 500 to 4,000 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Cieneba and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cieneba

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 22 inches: weathered bedrock

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: 14 to 22 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

Rock outcrop
Percent of map unit: 10 percent
Hydric soil rating: No

Vista
Percent of map unit: 3 percent
Hydric soil rating: No

Fallbrook
Percent of map unit: 3 percent
Hydric soil rating: No

Escondido
Percent of map unit: 3 percent
Hydric soil rating: No

Friant
Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 3 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

CrD—Cortina cobbly sandy loam, 2 to 12 percent slopes

Map Unit Setting

National map unit symbol: hcsm
Elevation: 30 to 2,400 feet
Mean annual precipitation: 12 to 40 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 240 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition

Cortina and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cortina

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metasedimentary rock

Typical profile

H1 - 0 to 23 inches: cobbly sandy loam
H2 - 23 to 38 inches: stratified very cobbly loamy sand to very cobbly loam
H3 - 38 to 60 inches: stratified very gravelly sand to very gravelly loamy sand

Properties and qualities

Slope: 2 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R019XD035CA - SANDY (1975)
Hydric soil rating: No

Minor Components

Garretson
Percent of map unit: 10 percent
Hydric soil rating: No

Arbuckle
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

EcD2—Escondido fine sandy loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: hctc
Elevation: 400 to 2,800 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Escondido and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Escondido

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from metamorphic rock

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 34 inches: silt loam
H3 - 34 to 38 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Friant
Percent of map unit: 3 percent
Hydric soil rating: No

Vallecitos
Percent of map unit: 3 percent
Hydric soil rating: No

Vista
Percent of map unit: 3 percent
Hydric soil rating: No

Fallbrook
Percent of map unit: 3 percent
Hydric soil rating: No

Lodo
Percent of map unit: 3 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

FfC2—Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hctw
Elevation: 300 to 2,000 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Fallbrook and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fallbrook

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from granodiorite and/or residuum weathered from tonalite

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 24 inches: sandy clay loam
H3 - 24 to 28 inches: bedrock

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY

Hydric soil rating: No

Minor Components

Bonsall
Percent of map unit: 5 percent
Hydric soil rating: No

Cieneba
Percent of map unit: 5 percent
Hydric soil rating: No

Vista
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

HcC—Hanford coarse sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y8tk
Elevation: 680 to 2,930 feet
Mean annual precipitation: 9 to 17 inches
Mean annual air temperature: 63 to 65 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hanford and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hanford

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

A - 0 to 8 inches: coarse sandy loam
C1 - 8 to 40 inches: fine sandy loam
C2 - 40 to 60 inches: stratified loamy sand to coarse sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R020XD012CA - SANDY

Hydric soil rating: No

Minor Components

Greenfield
Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ramona
Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tujunga
Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed
Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 1 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

LpE2—Lodo rocky loam, 8 to 25 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcwr
Elevation: 300 to 4,000 feet
Mean annual precipitation: 8 to 35 inches
Mean annual air temperature: 45 to 64 degrees F
Frost-free period: 110 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Lodo and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lodo

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Metamorphosed residuum weathered from sandstone

Typical profile

H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

Rock outcrop
Percent of map unit: 10 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 3 percent
Hydric soil rating: No

Vallecitos
Percent of map unit: 3 percent
Hydric soil rating: No

Escondido
Percent of map unit: 3 percent
Hydric soil rating: No

Temescal
Percent of map unit: 3 percent
Hydric soil rating: No

Cajalco
Percent of map unit: 3 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

LpF2—Lodo rocky loam, 25 to 50 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcws
Elevation: 300 to 3,500 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Lodo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lodo

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Metamorphosed residuum weathered from sandstone

Typical profile

H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

Tumescal
Percent of map unit: 5 percent
Hydric soil rating: No

Escondido
Percent of map unit: 5 percent
Hydric soil rating: No

Vallecitos
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

VeD2—Vallecitos loam, thick solum variant, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: hczr
Elevation: 600 to 2,500 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 to 64 degrees F
Frost-free period: 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Vallecitos and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vallecitos

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from metamorphosed sedimentary rock

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 27 inches: clay loam
H3 - 27 to 48 inches: loam
H4 - 48 to 52 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Fallbrook

Percent of map unit: 5 percent
Hydric soil rating: No

Friant

Percent of map unit: 5 percent
Hydric soil rating: No

Lodo

Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

VsC—Vista coarse sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hczx
Elevation: 400 to 3,900 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 210 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Vista and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vista

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from granite and/or residuum weathered from granodiorite

Typical profile

H1 - 0 to 15 inches: coarse sandy loam
H2 - 15 to 24 inches: coarse sandy loam
H3 - 24 to 30 inches: weathered bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Bonsall
Percent of map unit: 5 percent
Hydric soil rating: No

Fallbrook
Percent of map unit: 5 percent
Hydric soil rating: No

Cieneba
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Western Riverside Area, California

VsD2—Vista coarse sandy loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: hczy
Elevation: 400 to 3,900 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 210 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Vista and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vista

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from granite and/or residuum weathered from granodiorite

Typical profile

H1 - 0 to 15 inches: coarse sandy loam
H2 - 15 to 24 inches: coarse sandy loam
H3 - 24 to 28 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY

Hydric soil rating: No

Minor Components

Fallbrook
Percent of map unit: 5 percent
Hydric soil rating: No

Bonsall
Percent of map unit: 5 percent
Hydric soil rating: No

Cieneba
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

LAND USE/IMPERVIOUSNESS DATA TABLE (PLATE D-5.5 & D-5.6)

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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RUNOFF INDEX NUMBERS FOR PERVIOUS AREA

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

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IMPERVIOUS COVER FOR DEVELOPED AREAS

PRECIPITATION
(NOAA ATLAS 14, VOLUME 6, VERSION 2)

NOAA Atlas 14, Volume 6, Version 2
Location name: Perris, California, USA*
Latitude: 33.7196°, Longitude: -117.2792°
Elevation: 1562.72 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.086 (0.072-0.104)	0.120 (0.100-0.145)	0.167 (0.139-0.202)	0.206 (0.171-0.252)	0.262 (0.209-0.332)	0.307 (0.240-0.398)	0.355 (0.270-0.471)	0.406 (0.300-0.555)	0.478 (0.338-0.683)	0.536 (0.366-0.795)
10-min	0.123 (0.103-0.148)	0.172 (0.144-0.208)	0.239 (0.199-0.289)	0.296 (0.244-0.361)	0.376 (0.300-0.476)	0.441 (0.344-0.570)	0.509 (0.387-0.675)	0.582 (0.430-0.795)	0.685 (0.484-0.978)	0.769 (0.525-1.14)
15-min	0.149 (0.125-0.179)	0.208 (0.174-0.251)	0.289 (0.241-0.350)	0.357 (0.296-0.437)	0.455 (0.363-0.575)	0.533 (0.416-0.689)	0.615 (0.468-0.817)	0.703 (0.520-0.962)	0.828 (0.586-1.18)	0.930 (0.634-1.38)
30-min	0.235 (0.197-0.283)	0.328 (0.275-0.396)	0.456 (0.380-0.552)	0.564 (0.466-0.689)	0.718 (0.573-0.908)	0.841 (0.657-1.09)	0.971 (0.739-1.29)	1.11 (0.820-1.52)	1.31 (0.924-1.87)	1.47 (1.00-2.17)
60-min	0.348 (0.291-0.419)	0.486 (0.406-0.587)	0.675 (0.563-0.817)	0.835 (0.690-1.02)	1.06 (0.848-1.34)	1.24 (0.972-1.61)	1.44 (1.09-1.91)	1.64 (1.21-2.25)	1.94 (1.37-2.76)	2.17 (1.48-3.22)
2-hr	0.525 (0.439-0.633)	0.699 (0.584-0.844)	0.934 (0.779-1.13)	1.13 (0.936-1.38)	1.41 (1.13-1.78)	1.63 (1.27-2.11)	1.86 (1.42-2.47)	2.10 (1.55-2.88)	2.45 (1.73-3.49)	2.72 (1.86-4.03)
3-hr	0.650 (0.544-0.784)	0.853 (0.713-1.03)	1.13 (0.939-1.36)	1.35 (1.12-1.65)	1.67 (1.34-2.12)	1.92 (1.50-2.49)	2.19 (1.66-2.90)	2.46 (1.82-3.36)	2.84 (2.01-4.06)	3.15 (2.15-4.67)
6-hr	0.927 (0.776-1.12)	1.21 (1.01-1.46)	1.58 (1.32-1.91)	1.89 (1.56-2.31)	2.31 (1.85-2.93)	2.65 (2.07-3.42)	2.99 (2.28-3.97)	3.35 (2.48-4.58)	3.85 (2.72-5.49)	4.24 (2.89-6.27)
12-hr	1.22 (1.02-1.47)	1.62 (1.36-1.96)	2.15 (1.79-2.60)	2.58 (2.13-3.15)	3.17 (2.53-4.01)	3.62 (2.83-4.68)	4.08 (3.10-5.42)	4.55 (3.37-6.23)	5.20 (3.68-7.43)	5.70 (3.89-8.45)
24-hr	1.60 (1.42-1.85)	2.21 (1.95-2.55)	3.00 (2.64-3.47)	3.64 (3.18-4.25)	4.50 (3.81-5.42)	5.16 (4.28-6.34)	5.82 (4.72-7.33)	6.50 (5.13-8.41)	7.42 (5.62-10.0)	8.14 (5.96-11.3)
2-day	1.90 (1.68-2.19)	2.69 (2.38-3.11)	3.73 (3.28-4.32)	4.57 (3.99-5.33)	5.71 (4.83-6.88)	6.59 (5.46-8.10)	7.48 (6.06-9.42)	8.40 (6.62-10.9)	9.65 (7.31-13.0)	10.6 (7.79-14.8)
3-day	2.04 (1.80-2.35)	2.93 (2.59-3.39)	4.11 (3.62-4.76)	5.07 (4.43-5.92)	6.39 (5.41-7.71)	7.41 (6.15-9.12)	8.46 (6.85-10.7)	9.55 (7.53-12.4)	11.0 (8.36-14.9)	12.2 (8.95-17.0)
4-day	2.19 (1.94-2.53)	3.18 (2.81-3.68)	4.49 (3.96-5.21)	5.57 (4.87-6.51)	7.06 (5.97-8.51)	8.22 (6.81-10.1)	9.41 (7.62-11.8)	10.7 (8.40-13.8)	12.4 (9.37-16.7)	13.7 (10.1-19.1)
7-day	2.47 (2.19-2.86)	3.62 (3.19-4.18)	5.15 (4.54-5.97)	6.44 (5.62-7.51)	8.23 (6.96-9.92)	9.64 (8.00-11.9)	11.1 (9.01-14.0)	12.7 (10.00-16.4)	14.9 (11.3-20.0)	16.6 (12.2-23.1)
10-day	2.61 (2.31-3.02)	3.83 (3.38-4.43)	5.49 (4.83-6.36)	6.89 (6.02-8.04)	8.86 (7.50-10.7)	10.4 (8.65-12.8)	12.1 (9.79-15.2)	13.9 (10.9-17.9)	16.3 (12.4-22.0)	18.4 (13.4-25.6)
20-day	3.10 (2.74-3.58)	4.56 (4.03-5.27)	6.60 (5.81-7.64)	8.35 (7.30-9.75)	10.9 (9.21-13.1)	12.9 (10.7-15.9)	15.1 (12.3-19.1)	17.5 (13.8-22.7)	21.0 (15.9-28.3)	23.8 (17.5-33.2)
30-day	3.65 (3.23-4.22)	5.35 (4.72-6.18)	7.74 (6.82-8.97)	9.82 (8.58-11.5)	12.9 (10.9-15.5)	15.4 (12.8-18.9)	18.1 (14.7-22.8)	21.1 (16.7-27.4)	25.5 (19.3-34.4)	29.2 (21.4-40.7)
45-day	4.28 (3.79-4.94)	6.18 (5.46-7.14)	8.89 (7.83-10.3)	11.3 (9.86-13.2)	14.9 (12.6-17.9)	17.9 (14.8-22.0)	21.1 (17.1-26.6)	24.8 (19.6-32.1)	30.2 (22.9-40.7)	34.9 (25.5-48.6)
60-day	4.95 (4.38-5.72)	7.02 (6.20-8.11)	10.0 (8.81-11.6)	12.7 (11.1-14.8)	16.7 (14.1-20.1)	20.1 (16.7-24.7)	23.9 (19.4-30.1)	28.2 (22.2-36.4)	34.6 (26.2-46.6)	40.1 (29.4-55.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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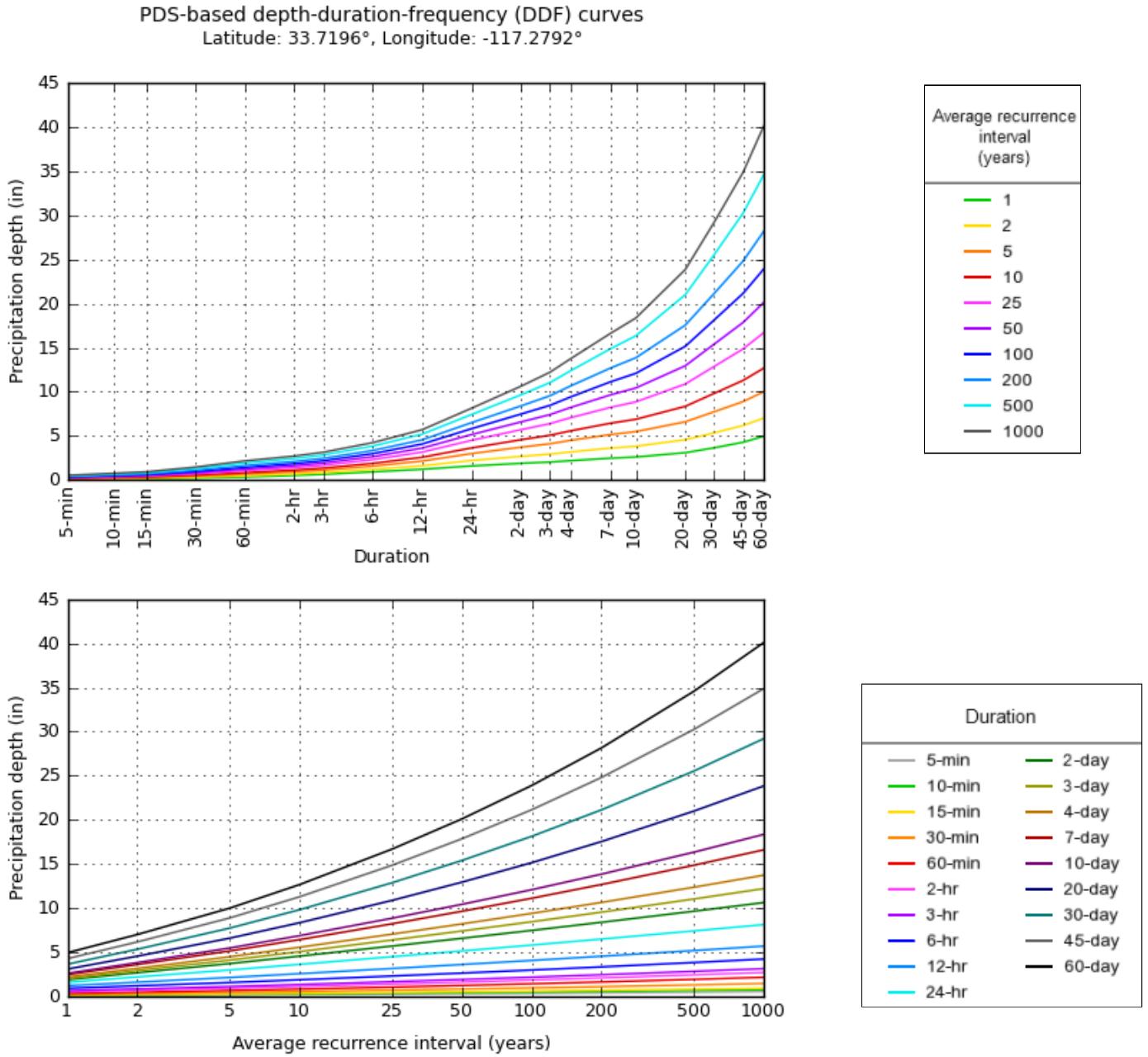
PF graphical



NOAA Atlas 14, Volume 6, Version 2

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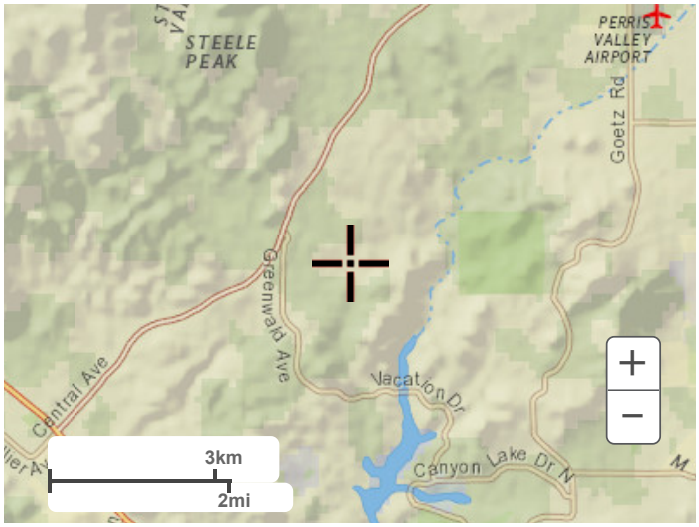
Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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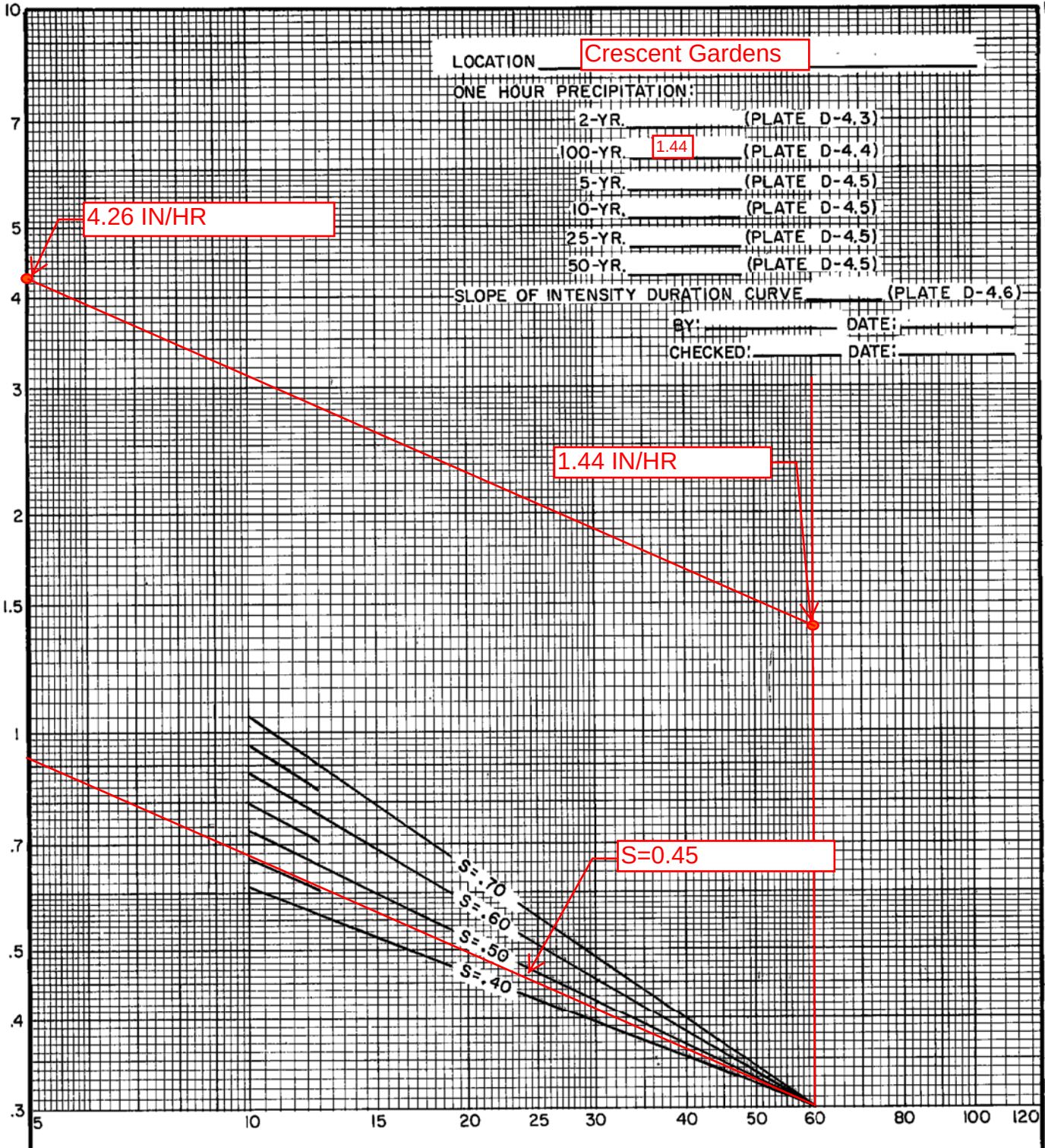

RCFC & WCD

HYDROLOGY MANUAL

INTENSITY—DURATION CURVES CALCULATION SHEET

PLATE D-4.7

January 2025

PRELIMINARY HYDROLOGY REPORT

For

CRESCENT GARDENS CEMETERY

Meadowbrook Community

CUP23002

County of Riverside, CA

HUNSAKER & ASSOCIATES IRVINE, INC.