

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/06/15

VALLEY CORRIDOR SP DRAINAGE STUDY
100-YEAR STORM
DEVELOPED CONDITIONS - SP
FILE: VALLEY100.RSBC

Program License Serial Number 4010

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.869(In.)
100 Year storm 1 hour rainfall = 1.380(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.380 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

Process from Point/Station 11.000 to Point/Station 12.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587(In/Hr)
Initial subarea data:
Initial area flow distance = 900.000(Ft.)
Top (of initial area) elevation = 1134.000(Ft.)
Bottom (of initial area) elevation = 1121.000(Ft.)
Difference in elevation = 13.000(Ft.)
Slope = 0.01444 s(%)= 1.44
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.610 min.
Rainfall intensity = 3.221(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.736
Subarea runoff = 23.708(CFS)
Total initial stream area = 10.000(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.587(In/Hr)

Process from Point/Station 12.000 to Point/Station 13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1121.000(Ft.)
Downstream point/station elevation = 1115.000(Ft.)

Pipe length = 660.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 23.708(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 23.708(CFS)
Normal flow depth in pipe = 18.33(In.)
Flow top width inside pipe = 25.21(In.)
Critical Depth = 20.44(In.)
Pipe flow velocity = 8.26(Ft/s)
Travel time through pipe = 1.33 min.
Time of concentration (TC) = 15.94 min.

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Process from Point/Station 12.000 to Point/Station 13.000
**** SUBAREA FLOW ADDITION ****

RESIDENTIAL(5 - 7 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.5000 Max loss rate(Fm)= 0.489(In/Hr)
Time of concentration = 15.94 min.
Rainfall intensity = 3.057(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.737
Subarea runoff = 10.076(CFS) for 5.000(Ac.)
Total runoff = 33.784(CFS)
Effective area this stream = 15.00(Ac.)
Total Study Area (Main Stream No. 1) = 15.00(Ac.)
Area averaged Fm value = 0.554(In/Hr)

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Process from Point/Station 12.000 to Point/Station 13.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fm)= 0.342(In/Hr)
Time of concentration = 15.94 min.
Rainfall intensity = 3.057(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.768
Subarea runoff = 36.888(CFS) for 15.100(Ac.)
Total runoff = 70.673(CFS)
Effective area this stream = 30.10(Ac.)
Total Study Area (Main Stream No. 1) = 30.10(Ac.)
Area averaged Fm value = 0.448(In/Hr)

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Process from Point/Station 13.000 to Point/Station 14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1110.000(Ft.)
Downstream point/station elevation = 1108.000(Ft.)
Pipe length = 660.00(Ft.) Manning's N = 0.013

No. of pipes = 1 Required pipe flow = 70.673(CFS)
Nearest computed pipe diameter = 48.00(In.)
Calculated individual pipe flow = 70.673(CFS)
Normal flow depth in pipe = 35.39(In.)
Flow top width inside pipe = 42.25(In.)
Critical Depth = 30.49(In.)
Pipe flow velocity = 7.11(Ft/s)
Travel time through pipe = 1.55 min.
Time of concentration (TC) = 17.49 min.

Process from Point/Station 13.000 to Point/Station 14.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fm)= 0.342(In/Hr)
Time of concentration = 17.49 min.
Rainfall intensity = 2.891(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.775
Subarea runoff = 49.673(CFS) for 23.600(Ac.)
Total runoff = 120.345(CFS)
Effective area this stream = 53.70(Ac.)
Total Study Area (Main Stream No. 1) = 53.70(Ac.)
Area averaged Fm value = 0.401(In/Hr)

Process from Point/Station 14.000 to Point/Station 15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1108.000(Ft.)
Downstream point/station elevation = 1105.000(Ft.)
Pipe length = 1000.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 120.345(CFS)
Nearest computed pipe diameter = 57.00(In.)
Calculated individual pipe flow = 120.345(CFS)
Normal flow depth in pipe = 45.09(In.)
Flow top width inside pipe = 46.34(In.)
Critical Depth = 38.16(In.)
Pipe flow velocity = 8.00(Ft/s)
Travel time through pipe = 2.08 min.
Time of concentration (TC) = 19.57 min.

Process from Point/Station 14.000 to Point/Station 15.000
**** SUBAREA FLOW ADDITION ****

RESIDENTIAL(5 - 7 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.5000 Max loss rate(Fm)= 0.489(In/Hr)
Time of concentration = 19.57 min.

Rainfall intensity = 2.703(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.758
Subarea runoff = 30.720(CFS) for 20.000(Ac.)
Total runoff = 151.065(CFS)
Effective area this stream = 73.70(Ac.)
Total Study Area (Main Stream No. 1) = 73.70(Ac.)
Area averaged Fm value = 0.425(In/Hr)

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Process from Point/Station 14.000 to Point/Station 15.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fm)= 0.342(In/Hr)
Time of concentration = 19.57 min.
Rainfall intensity = 2.703(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.765
Subarea runoff = 45.036(CFS) for 21.200(Ac.)
Total runoff = 196.102(CFS)
Effective area this stream = 94.90(Ac.)
Total Study Area (Main Stream No. 1) = 94.90(Ac.)
Area averaged Fm value = 0.407(In/Hr)

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Process from Point/Station 18.000 to Point/Station 15.000
**** SUBAREA FLOW ADDITION ****

RESIDENTIAL(5 - 7 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.5000 Max loss rate(Fm)= 0.489(In/Hr)
Time of concentration = 19.57 min.
Rainfall intensity = 2.703(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.763
Subarea runoff = 9.962(CFS) for 5.000(Ac.)
Total runoff = 206.064(CFS)
Effective area this stream = 99.90(Ac.)
Total Study Area (Main Stream No. 1) = 99.90(Ac.)
Area averaged Fm value = 0.411(In/Hr)

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Process from Point/Station 18.000 to Point/Station 15.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
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

SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 19.57 min.
Rainfall intensity = 2.703(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.773
Subarea runoff = 23.913(CFS) for 10.200(Ac.)
Total runoff = 229.976(CFS)
Effective area this stream = 110.10(Ac.)
Total Study Area (Main Stream No. 1) = 110.10(Ac.)
Area averaged Fm value = 0.382(In/Hr)

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Process from Point/Station 15.000 to Point/Station 16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1105.000(Ft.)
Downstream point/station elevation = 1098.000(Ft.)
Pipe length = 500.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 229.976(CFS)
Nearest computed pipe diameter = 54.00(In.)
Calculated individual pipe flow = 229.976(CFS)
Normal flow depth in pipe = 43.69(In.)
Flow top width inside pipe = 42.45(In.)
Critical Depth = 50.41(In.)
Pipe flow velocity = 16.68(Ft/s)
Travel time through pipe = 0.50 min.
Time of concentration (TC) = 20.07 min.

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Process from Point/Station 15.000 to Point/Station 16.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 20.07 min.
Rainfall intensity = 2.662(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.777
Subarea runoff = 13.520(CFS) for 7.600(Ac.)
Total runoff = 243.496(CFS)
Effective area this stream = 117.70(Ac.)
Total Study Area (Main Stream No. 1) = 117.70(Ac.)
Area averaged Fm value = 0.363(In/Hr)

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Process from Point/Station 16.000 to Point/Station 17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1098.000(Ft.)
Downstream point/station elevation = 1096.000(Ft.)
Pipe length = 300.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 243.496(CFS)
Nearest computed pipe diameter = 66.00(In.)
Calculated individual pipe flow = 243.496(CFS)

Normal flow depth in pipe = 48.38(In.)
Flow top width inside pipe = 58.40(In.)
Critical Depth = 52.28(In.)
Pipe flow velocity = 13.04(Ft/s)
Travel time through pipe = 0.38 min.
Time of concentration (TC) = 20.46 min.

Process from Point/Station 21.000 to Point/Station 22.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(5 - 7 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.5000 Max loss rate(Fm)= 0.489(In/Hr)
Initial subarea data:
Initial area flow distance = 950.000(Ft.)
Top (of initial area) elevation = 1132.000(Ft.)
Bottom (of initial area) elevation = 1127.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.00526 s(%)= 0.53
TC = k(0.389)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.250 min.
Rainfall intensity = 2.915(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.749
Subarea runoff = 18.344(CFS)
Total initial stream area = 8.400(Ac.)
Pervious area fraction = 0.500
Initial area Fm value = 0.489(In/Hr)

Process from Point/Station 22.000 to Point/Station 23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1127.000(Ft.)
Downstream point/station elevation = 1113.000(Ft.)
Pipe length = 600.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 18.344(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 18.344(CFS)
Normal flow depth in pipe = 13.66(In.)
Flow top width inside pipe = 20.02(In.)
Critical Depth = 18.65(In.)
Pipe flow velocity = 11.07(Ft/s)
Travel time through pipe = 0.90 min.
Time of concentration (TC) = 18.15 min.

Process from Point/Station 22.000 to Point/Station 23.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2) = 32.00

Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 18.15 min.
Rainfall intensity = 2.827(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.818
Subarea runoff = 29.061(CFS) for 12.100(Ac.)
Total runoff = 47.405(CFS)
Effective area this stream = 20.50(Ac.)
Total Study Area (Main Stream No. 1) = 138.20(Ac.)
Area averaged Fm value = 0.258(In/Hr)

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Process from Point/Station 23.000 to Point/Station 24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1107.000(Ft.)
Downstream point/station elevation = 1102.000(Ft.)
Pipe length = 820.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 47.405(CFS)
Nearest computed pipe diameter = 36.00(In.)
Calculated individual pipe flow = 47.405(CFS)
Normal flow depth in pipe = 26.95(In.)
Flow top width inside pipe = 31.23(In.)
Critical Depth = 26.92(In.)
Pipe flow velocity = 8.35(Ft/s)
Travel time through pipe = 1.64 min.
Time of concentration (TC) = 19.79 min.

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Process from Point/Station 23.000 to Point/Station 24.000
**** SUBAREA FLOW ADDITION ****

RESIDENTIAL(5 - 7 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.5000 Max loss rate(Fm)= 0.489(In/Hr)
Time of concentration = 19.79 min.
Rainfall intensity = 2.685(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.783
Subarea runoff = 23.453(CFS) for 13.200(Ac.)
Total runoff = 70.858(CFS)
Effective area this stream = 33.70(Ac.)
Total Study Area (Main Stream No. 1) = 151.40(Ac.)
Area averaged Fm value = 0.348(In/Hr)

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Process from Point/Station 23.000 to Point/Station 24.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)

Time of concentration = 19.79 min.
Rainfall intensity = 2.685(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.810
Subarea runoff = 36.553(CFS) for 15.700(Ac.)
Total runoff = 107.411(CFS)
Effective area this stream = 49.40(Ac.)
Total Study Area (Main Stream No. 1) = 167.10(Ac.)
Area averaged Fm value = 0.269(In/Hr)

Process from Point/Station 24.000 to Point/Station 25.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1102.000(Ft.)
Downstream point/station elevation = 1100.000(Ft.)
Pipe length = 330.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 107.411(CFS)
Nearest computed pipe diameter = 48.00(In.)
Calculated individual pipe flow = 107.411(CFS)
Normal flow depth in pipe = 37.73(In.)
Flow top width inside pipe = 39.36(In.)
Critical Depth = 37.61(In.)
Pipe flow velocity = 10.13(Ft/s)
Travel time through pipe = 0.54 min.
Time of concentration (TC) = 20.33 min.

Process from Point/Station 24.000 to Point/Station 25.000
**** SUBAREA FLOW ADDITION ****

RESIDENTIAL(5 - 7 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.5000 Max loss rate(Fm)= 0.489(In/Hr)
Time of concentration = 20.33 min.
Rainfall intensity = 2.641(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.793
Subarea runoff = 22.876(CFS) for 12.800(Ac.)
Total runoff = 130.286(CFS)
Effective area this stream = 62.20(Ac.)
Total Study Area (Main Stream No. 1) = 179.90(Ac.)
Area averaged Fm value = 0.314(In/Hr)

Process from Point/Station 26.000 to Point/Station 25.000
**** SUBAREA FLOW ADDITION ****

RESIDENTIAL(5 - 7 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.5000 Max loss rate(Fm)= 0.489(In/Hr)
Time of concentration = 20.33 min.

Rainfall intensity = 2.641(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.788
Subarea runoff = 12.011(CFS) for 6.200(Ac.)
Total runoff = 142.298(CFS)
Effective area this stream = 68.40(Ac.)
Total Study Area (Main Stream No. 1) = 186.10(Ac.)
Area averaged Fm value = 0.330(In/Hr)

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Process from Point/Station 26.000 to Point/Station 25.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 20.33 min.
Rainfall intensity = 2.641(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.791
Subarea runoff = 7.555(CFS) for 3.300(Ac.)
Total runoff = 149.853(CFS)
Effective area this stream = 71.70(Ac.)
Total Study Area (Main Stream No. 1) = 189.40(Ac.)
Area averaged Fm value = 0.319(In/Hr)

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Process from Point/Station 25.000 to Point/Station 27.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1100.000(Ft.)
Downstream point/station elevation = 1092.000(Ft.)
Pipe length = 680.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 149.853(CFS)
Nearest computed pipe diameter = 48.00(In.)
Calculated individual pipe flow = 149.853(CFS)
Normal flow depth in pipe = 37.78(In.)
Flow top width inside pipe = 39.30(In.)
Critical Depth = 43.13(In.)
Pipe flow velocity = 14.12(Ft/s)
Travel time through pipe = 0.80 min.
Time of concentration (TC) = 21.14 min.

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Process from Point/Station 25.000 to Point/Station 27.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 21.14 min.
Rainfall intensity = 2.581(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.804
Subarea runoff = 35.641(CFS) for 17.700(Ac.)
Total runoff = 185.494(CFS)
Effective area this stream = 89.40(Ac.)
Total Study Area (Main Stream No. 1) = 207.10(Ac.)
Area averaged Fm value = 0.275(In/Hr)

Process from Point/Station 27.000 to Point/Station 28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1092.000(Ft.)
Downstream point/station elevation = 1091.000(Ft.)
Pipe length = 60.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 185.494(CFS)
Nearest computed pipe diameter = 48.00(In.)
Calculated individual pipe flow = 185.494(CFS)
Normal flow depth in pipe = 39.36(In.)
Flow top width inside pipe = 36.88(In.)
Critical Depth = 45.56(In.)
Pipe flow velocity = 16.82(Ft/s)
Travel time through pipe = 0.06 min.
Time of concentration (TC) = 21.20 min.
End of computations, Total Study Area = 207.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.333
Area averaged SCS curve number = 32.0