

PRELIMINARY DRAINAGE REPORT
LUMINA III (PTS# _____)
CITY OF SAN DIEGO, CA
September 23rd, 2019

Prepared For:

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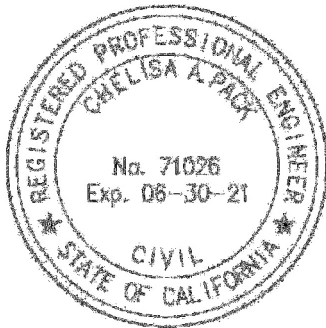


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1. INTRODUCTION

This report describes the proposed storm water drainage improvements for the Lumina III entitlement submittal. The Lumina III project is owned by Colrich, and represents a portion of the Otay Mesa Central Village Specific Plan (CVSP) area. The TM development proposes development consistent with the land use designations of the approved Specific Plan. The overall drainage criteria for the project was identified in the technical report for the Specific Plan, entitled *Preliminary Drainage and Water Quality Summary for the Otay Mesa Central Village Specific Plan* (PTS 408329), which was prepared by Project Design Consultants and is dated January 22, 2016. Subsequent to the development of the Specific Plan report, Project Design Consultants prepared a Tentative Map for the Lumina Project (PTS# 555609) and the project-level drainage study for the Lumina project is dated August 15, 2018. At the time of the development of the Lumina TM, the Lopez property which is now known as the “Lumina III Project” was not owned by Colrich, but was subsequently acquired. Therefore, this subsequent entitlement is for the Lumina III property, which eventually will be developed as part of the overall Lumina project site plan, but a separate entitlement is required. The project is located South of the 905 highway along Cactus Road and northwest of the Siempre Viva intersection. See Figure 1 for a Vicinity Map.

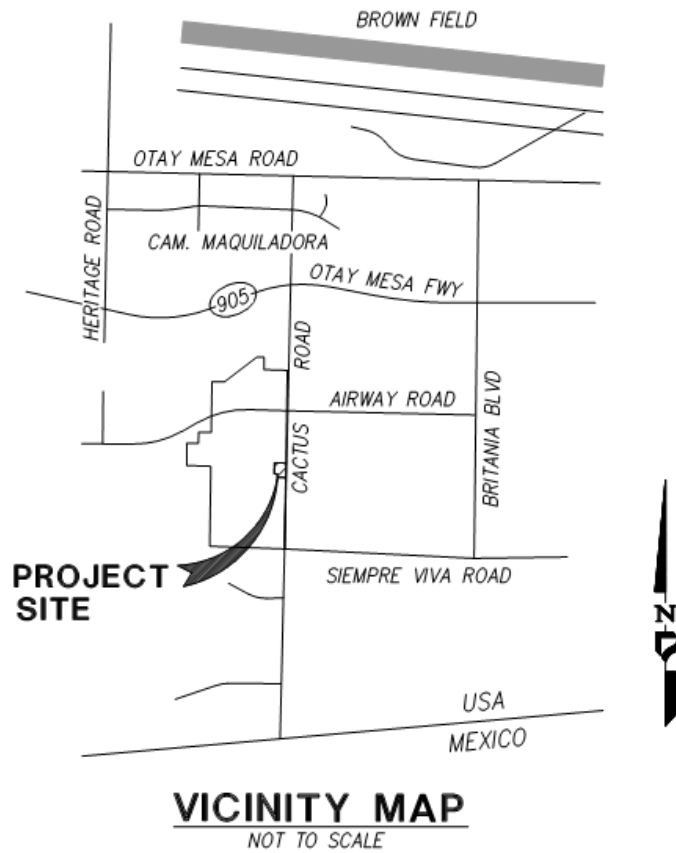


Figure 1: Vicinity Map

2. PROJECT BACKGROUND & RELATION TO PREVIOUS STUDIES

The project site was previously included in the drainage area evaluated in the preliminary Lumina Drainage Study (PTS #555609) because the Lumina project surrounded the Lumina III parcel and therefore incorporated the runoff into the overall study. The Lumina III parcel was modeled in the previous study with a runoff coefficient for a rural site. Therefore, this is updated in this report to display the ultimate condition of a multi unit site. This Lumina III report, as a supplemental document to the approved TM Lumina Preliminary Drainage Study, shows that this Lumina III project is in compliance with the drainage criteria and will be incorporated into the overall Lumina site plan and project.

3. EXISTING AND PROPOSED DRAINAGE PATTERNS AND IMPROVEMENTS

The following sections provide descriptions of the existing and proposed drainage patterns and improvements for the project.

3.1 Existing Drainage Patterns

The site currently has a single family home in the south and a wood shed on the northeastern edge of the project. The rest of the site consists of dirt, shrubs, and trees. Topography within the project site is characterized by mostly gently sloping areas. There are currently minimal drainage improvements within the project boundary. The site drains to the south across the property boundary into the Lumina property, which is also owned by Colrich. From an overall perspective, the site drains to the south to a steep finger canyon (Wruck Creek) located to the west of the existing Cactus Road/Siempre Viva Road intersection. Two of the finger canyons drain to sump areas that are collected and drained to the west and discharged downstream within the canyon via an existing RCP storm drain per City Drawing 23871-21-D.

3.2 Proposed Drainage Improvements

The proposed drainage patterns and drainage improvements have been designed to mimic existing drainage patterns. All proposed drainage improvements from the Lumina III project can be found within the Lumina Preliminary Drainage Study (PTS#555609) and will be further refined during final engineering. The Lumina III project was previously modeled in Lumina TM Drainage Study using the rural runoff coefficient. This report includes an update to that analysis with the ultimate condition using the multi-unit runoff coefficient. The drainage improvements for the proposed Lumina III project will drain into the storm drain improvements for the Lumina project, and the drainage will be detained in the proposed Lumina South Basin.

4. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS

The hydrologic analysis was performed for the overall Lumina site and can be found in the approved Lumina Drainage Study (PTS#555609), which is included in this submittal for reference. For the Lumina III project, the land use coefficient for the Lopez property was

updated and updated hydrology is included in the appendix. The increase overall from the original Lumina Study and the change in land use with Lumina III increased the 100-year flow by 0.6 cfs from 151.6 cfs to 152.2 cfs which can be seen in the table below.

	EXISTING CONDITIONS			PROPOSED CONDITIONS		
<u><i>Outfall of Interest</i></u>	<u><i>System</i></u>	<u><i>Q₁₀₀</i></u> <u><i>(cfs)</i></u>	<u><i>Contrib. Area</i></u> <u><i>(acres)</i></u>	<u><i>System</i></u>	<u><i>Q₁₀₀</i></u> <u><i>(cfs)</i></u>	<u><i>Contrib. Area</i></u> <u><i>(acres)</i></u>
North	System 300	37.7	30.1	System 3000	3.9	0.9
	System 500	11.7	7.7	System 4000	105.6 undetained 13.4 detained*	33.9
				System 5000	4.0	1.9
	Subtotal:	49.4	37.8	Subtotal:	49.4	36.7
South(Outfall for Lumina III flows)	System 100	28.4	20.7	System 1000	152.2 undetained 36.7 detained*	63.4
	System 200	54.0	49.3	System 2000	10.2	8.2
	Subtotal:	82.4	70.0	Subtotal:	46.7	71.6
	Total:	131.8	107.8	Total:	≤ 131.8	108.3

Note: *Detained flow rates are based on the preliminary detention calculations. Final detention calculations will be prepared during final engineering.

With the detention updated the overall proposed conditions is still less than the proposed conditions.

5. CONCLUSION

The proposed project development complies with detention criteria outlined in previous studies, and therefore, should not adversely affect downstream drainage conditions. The storm drain infrastructure in the Lumina Drainage Study (PTS#555609) will be adequate to convey the

design flows and will be addressed regionally for both the Lumina and Lumina III projects. The storm drain detention facilities are designed as combined facilities for hydromodification and water quality purposes in addition to peak flow detention.

APPENDIX 1

Proposed Hydrologic Calculations CIVILD

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
Rational Hydrology Study Date: 08/08/19

2357.60 LUMINA III
PROPOSED CONDITIONS
SYSTEM 100, FILE: 1000P100

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

Program License Serial Number 4049

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

Process from Point/Station 1000.000 to Point/Station 1001.000
**** INITIAL AREA EVALUATION ****

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
[INDUSTRIAL area type]
Initial subarea flow distance = 343.000(Ft.)
Highest elevation = 497.900(Ft.)
Lowest elevation = 492.100(Ft.)
Elevation difference = 5.800(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) = 4.20 min.
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5}] / (\% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.9500) * (343.000^{.5}) / (1.691^{(1/3)})] = 4.20$
Setting time of concentration to 5 minutes
Rainfall intensity (I) = 4.389(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff = 1.209(CFS)
Total initial stream area = 0.290(Ac.)

Process from Point/Station 1001.000 to Point/Station 1003.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 488.500(Ft.)
Downstream point/station elevation = 488.300(Ft.)
Pipe length = 18.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.209(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.209(CFS)
Normal flow depth in pipe = 5.51(In.)
Flow top width inside pipe = 8.77(In.)
Critical Depth = 6.07(In.)
Pipe flow velocity = 4.26(Ft/s)
Travel time through pipe = 0.07 min.
Time of concentration (TC) = 5.07 min.

Process from Point/Station 1002.000 to Point/Station 1003.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 5.07 min.
Rainfall intensity = 4.364(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 2.073(CFS) for 0.500(Ac.)
Total runoff = 3.282(CFS) Total area = 0.79(Ac.)

Process from Point/Station 1003.000 to Point/Station 1007.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 488.300(Ft.)
Downstream point/station elevation = 483.100(Ft.)
Pipe length = 411.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.282(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 3.282(CFS)
Normal flow depth in pipe = 8.26(In.)
Flow top width inside pipe = 11.11(In.)
Critical Depth = 9.31(In.)
Pipe flow velocity = 5.69(Ft/s)
Travel time through pipe = 1.20 min.
Time of concentration (TC) = 6.27 min.

Process from Point/Station 1003.000 to Point/Station 1007.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.790(Ac.)
Runoff from this stream = 3.282(CFS)
Time of concentration = 6.27 min.
Rainfall intensity = 4.011(In/Hr)

Process from Point/Station 1004.000 to Point/Station 1005.000
**** INITIAL AREA EVALUATION ****

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
[MULTI - UNITS area type]
Initial subarea flow distance = 80.000(Ft.)
Highest elevation = 502.500(Ft.)
Lowest elevation = 501.700(Ft.)
Elevation difference = 0.800(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) = 6.44 min.
TC = $[1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})]$
TC = $[1.8 * (1.1 - 0.7000) * (80.000^{.5}) / (1.000^{(1/3)})] = 6.44$
Rainfall intensity (I) = 3.970(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.700
Subarea runoff = 1.195(CFS)
Total initial stream area = 0.430(Ac.)

Process from Point/Station 1005.000 to Point/Station 1006.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 501.700(Ft.)
Downstream point elevation = 496.500(Ft.)
Channel length thru subarea = 532.000(Ft.)
Channel base width = 2.000(Ft.)
Slope or 'Z' of left channel bank = 2.000
Slope or 'Z' of right channel bank = 2.000
Estimated mean flow rate at midpoint of channel = 8.421(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 2.000(Ft.)
Flow(q) thru subarea = 8.421(CFS)
Depth of flow = 0.537(Ft.), Average velocity = 5.096(Ft/s)
Channel flow top width = 4.150(Ft.)
Flow Velocity = 5.10(Ft/s)
Travel time = 1.74 min.
Time of concentration = 8.18 min.
Critical depth = 0.656(Ft.)
Adding area flow to channel
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
[MULTI - UNITS area type]
Rainfall intensity = 3.630(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.700
Subarea runoff = 13.213(CFS) for 5.200(Ac.)
Total runoff = 14.408(CFS) Total area = 5.63(Ac.)

Process from Point/Station 1006.000 to Point/Station 1009.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 483.700(Ft.)
Downstream point/station elevation = 483.400(Ft.)
Pipe length = 31.00(Ft.) Manning's N = 0.013

No. of pipes = 1 Required pipe flow = 14.408(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 14.408(CFS)
Normal flow depth in pipe = 15.94(In.)
Flow top width inside pipe = 17.96(In.)
Critical Depth = 16.91(In.)
Pipe flow velocity = 7.36(Ft/s)
Travel time through pipe = 0.07 min.
Time of concentration (TC) = 8.25 min.

Process from Point/Station 1009.000 to Point/Station 1009.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 8.25 min.
Rainfall intensity = 3.619(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 2.750(CFS) for 0.800(Ac.)
Total runoff = 17.158(CFS) Total area = 6.43(Ac.)

Process from Point/Station 1009.000 to Point/Station 1007.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 483.300(Ft.)
Downstream point/station elevation = 483.100(Ft.)
Pipe length = 22.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 17.158(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 17.158(CFS)
Normal flow depth in pipe = 16.17(In.)
Flow top width inside pipe = 22.50(In.)
Critical Depth = 17.91(In.)
Pipe flow velocity = 7.62(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 8.30 min.

Process from Point/Station 1008.000 to Point/Station 1007.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 8.30 min.
Rainfall intensity = 3.611(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 2.813(CFS) for 0.820(Ac.)
Total runoff = 19.971(CFS) Total area = 7.25(Ac.)

Process from Point/Station 1008.000 to Point/Station 1007.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 7.250(Ac.)
Runoff from this stream = 19.971(CFS)
Time of concentration = 8.30 min.
Rainfall intensity = 3.611(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
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1	3.282	6.27	4.011
2	19.971	8.30	3.611

Qmax(1) =
1.000 * 1.000 * 3.282 +
1.000 * 0.756 * 19.971 + = 18.381

Qmax(2) =
0.900 * 1.000 * 3.282 +
1.000 * 1.000 * 19.971 + = 22.926

Total of 2 streams to confluence:
Flow rates before confluence point:
3.282 19.971
Maximum flow rates at confluence using above data:
18.381 22.926
Area of streams before confluence:
0.790 7.250

Results of confluence:
Total flow rate = 22.926(CFS)
Time of concentration = 8.298 min.
Effective stream area after confluence = 8.040(Ac.)

Process from Point/Station 1007.000 to Point/Station 1027.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 483.100(Ft.)
Downstream point/station elevation = 481.450(Ft.)
Pipe length = 109.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 22.926(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 22.926(CFS)
Normal flow depth in pipe = 16.59(In.)
Flow top width inside pipe = 22.17(In.)
Critical Depth = 20.46(In.)
Pipe flow velocity = 9.89(Ft/s)
Travel time through pipe = 0.18 min.
Time of concentration (TC) = 8.48 min.

Process from Point/Station 1007.000 to Point/Station 1027.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1

Stream flow area = 8.040(Ac.)
Runoff from this stream = 22.926(CFS)
Time of concentration = 8.48 min.
Rainfall intensity = 3.582(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 1010.000 to Point/Station 1011.000
**** INITIAL AREA EVALUATION ****

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
[INDUSTRIAL area type]
Initial subarea flow distance = 120.000(Ft.)
Highest elevation = 515.000(Ft.)
Lowest elevation = 513.100(Ft.)
Elevation difference = 1.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) = 2.54 min.
TC = $[1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})]$
TC = $[1.8 * (1.1 - 0.9500) * (120.000^{.5})] / (1.583^{(1/3)}) = 2.54$
Setting time of concentration to 5 minutes
Rainfall intensity (I) = 4.389(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff = 0.792(CFS)
Total initial stream area = 0.190(Ac.)

Process from Point/Station 1011.000 to Point/Station 1013.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 513.100(Ft.)
End of street segment elevation = 495.400(Ft.)
Length of street segment = 772.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 23.000(Ft.)
Distance from crown to crossfall grade break = 18.000(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 = 12.000(Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 1.500(Ft.)
Gutter hike from flowline = 1.500(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 = 0.0180
Estimated mean flow rate at midpoint of street = 2.731(CFS)
Depth of flow = 0.281(Ft.), Average velocity = 2.909(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 9.315(Ft.)
Flow velocity = 2.91(Ft/s)
Travel time = 4.42 min. TC = 9.42 min.
Adding area flow to street
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
[INDUSTRIAL area type]
Rainfall intensity = 3.447(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 3.046(CFS) for 0.930(Ac.)
Total runoff = 3.838(CFS) Total area = 1.12(Ac.)
Street flow at end of street = 3.838(CFS)
Half street flow at end of street = 3.838(CFS)
Depth of flow = 0.310(Ft.), Average velocity = 3.124(Ft/s)
Flow width (from curb towards crown) = 10.758(Ft.)

Process from Point/Station 1012.000 to Point/Station 1013.000
**** SUBAREA FLOW ADDITION ****

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
[MULTI - UNITS area type]
Time of concentration = 9.42 min.
Rainfall intensity = 3.447(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.700
Subarea runoff = 7.481(CFS) for 3.100(Ac.)
Total runoff = 11.319(CFS) Total area = 4.22(Ac.)

Process from Point/Station 1013.000 to Point/Station 1015.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 491.800(Ft.)
Downstream point/station elevation = 488.200(Ft.)
Pipe length = 13.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.319(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 11.319(CFS)
Normal flow depth in pipe = 6.73(In.)
Flow top width inside pipe = 11.91(In.)
Critical depth could not be calculated.
Pipe flow velocity = 24.99(Ft/s)
Travel time through pipe = 0.01 min.
Time of concentration (TC) = 9.43 min.

Process from Point/Station 1013.000 to Point/Station 1015.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 9.43 min.
Rainfall intensity = 3.446(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 1.506(CFS) for 0.460(Ac.)
Total runoff = 12.825(CFS) Total area = 4.68(Ac.)

Process from Point/Station 1015.000 to Point/Station 1023.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 488.200(Ft.)
Downstream point/station elevation = 483.200(Ft.)
Pipe length = 444.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 12.825(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 12.825(CFS)
Normal flow depth in pipe = 13.73(In.)
Flow top width inside pipe = 19.98(In.)
Critical Depth = 16.00(In.)
Pipe flow velocity = 7.70(Ft/s)
Travel time through pipe = 0.96 min.
Time of concentration (TC) = 10.39 min.

Process from Point/Station 1015.000 to Point/Station 1023.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 4.680(Ac.)
Runoff from this stream = 12.825(CFS)
Time of concentration = 10.39 min.
Rainfall intensity = 3.327(In/Hr)

Process from Point/Station 1018.000 to Point/Station 1021.000
**** INITIAL AREA EVALUATION ****

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
[INDUSTRIAL area type]
Initial subarea flow distance = 371.000(Ft.)
Highest elevation = 494.000(Ft.)
Lowest elevation = 486.700(Ft.)
Elevation difference = 7.300(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) = 4.15 min.
TC = $[1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})$
TC = $[1.8 * (1.1 - 0.9500) * (371.000^{.5})] / (1.968^{(1/3)}) = 4.15$
Setting time of concentration to 5 minutes
Rainfall intensity (I) = 4.389(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff = 3.002(CFS)
Total initial stream area = 0.720(Ac.)

Process from Point/Station 1020.000 to Point/Station 1021.000
**** SUBAREA FLOW ADDITION ****

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
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration = 5.00 min.
Rainfall intensity = 4.389(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.450
Subarea runoff = 5.905(CFS) for 2.990(Ac.)
Total runoff = 8.908(CFS) Total area = 3.71(Ac.)

Process from Point/Station 1021.000 to Point/Station 1023.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 483.300(Ft.)
Downstream point/station elevation = 483.200(Ft.)
Pipe length = 15.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.908(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 8.908(CFS)
Normal flow depth in pipe = 12.80(In.)
Flow top width inside pipe = 20.49(In.)
Critical Depth = 13.31(In.)
Pipe flow velocity = 5.80(Ft/s)
Travel time through pipe = 0.04 min.
Time of concentration (TC) = 5.04 min.

Process from Point/Station 1022.000 to Point/Station 1023.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 5.04 min.
Rainfall intensity = 4.374(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 3.116(CFS) for 0.750(Ac.)
Total runoff = 12.024(CFS) Total area = 4.46(Ac.)

Process from Point/Station 1022.000 to Point/Station 1023.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 4.460(Ac.)
Runoff from this stream = 12.024(CFS)
Time of concentration = 5.04 min.
Rainfall intensity = 4.374(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	12.825	10.39	3.327
2	12.024	5.04	4.374
Qmax(1) =			

1.000 * 1.000 * 12.825) +
0.761 * 1.000 * 12.024) + = 21.973
Qmax(2) =
1.000 * 0.485 * 12.825) +
1.000 * 1.000 * 12.024) + = 18.247

Total of 2 streams to confluence:
Flow rates before confluence point:
12.825 12.024
Maximum flow rates at confluence using above data:
21.973 18.247
Area of streams before confluence:
4.680 4.460
Results of confluence:
Total flow rate = 21.973(CFS)
Time of concentration = 10.393 min.
Effective stream area after confluence = 9.140(Ac.)

Process from Point/Station 1023.000 to Point/Station 1027.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 482.900(Ft.)
Downstream point/station elevation = 481.500(Ft.)
Pipe length = 158.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 21.973(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 21.973(CFS)
Normal flow depth in pipe = 20.44(In.)
Flow top width inside pipe = 17.07(In.)
Critical Depth = 20.08(In.)
Pipe flow velocity = 7.71(Ft/s)
Travel time through pipe = 0.34 min.
Time of concentration (TC) = 10.73 min.

Process from Point/Station 1023.000 to Point/Station 1027.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 9.140(Ac.)
Runoff from this stream = 21.973(CFS)
Time of concentration = 10.73 min.
Rainfall intensity = 3.289(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	22.926	8.48	3.582
2	21.973	10.73	3.289
Qmax(1) =			
	1.000 * 1.000 * 22.926) +		
	1.000 * 0.790 * 21.973) + =		40.287
Qmax(2) =			
	0.918 * 1.000 * 22.926) +		
	1.000 * 1.000 * 21.973) + =		43.021

Total of 2 main streams to confluence:
Flow rates before confluence point:
22.926 21.973
Maximum flow rates at confluence using above data:
40.287 43.021
Area of streams before confluence:
8.040 9.140

Results of confluence:
Total flow rate = 43.021(CFS)
Time of concentration = 10.735 min.
Effective stream area after confluence = 17.180(Ac.)

Process from Point/Station 1024.000 to Point/Station 1027.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 10.73 min.
Rainfall intensity = 3.289(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 2.281(CFS) for 0.730(Ac.)
Total runoff = 45.302(CFS) Total area = 17.91(Ac.)

Process from Point/Station 1025.000 to Point/Station 1027.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 10.73 min.
Rainfall intensity = 3.289(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 2.406(CFS) for 0.770(Ac.)
Total runoff = 47.707(CFS) Total area = 18.68(Ac.)

Process from Point/Station 1027.000 to Point/Station 1030.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 481.500(Ft.)
Downstream point/station elevation = 478.900(Ft.)
Pipe length = 389.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 47.707(CFS)
Nearest computed pipe diameter = 36.00(In.)
Calculated individual pipe flow = 47.707(CFS)
Normal flow depth in pipe = 26.09(In.)
Flow top width inside pipe = 32.16(In.)
Critical Depth = 26.97(In.)

Pipe flow velocity = 8.70(Ft/s)
Travel time through pipe = 0.75 min.
Time of concentration (TC) = 11.48 min.

Process from Point/Station 1027.000 to Point/Station 1030.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 11.48 min.
Rainfall intensity = 3.210(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 0.945(CFS) for 0.310(Ac.)
Total runoff = 48.653(CFS) Total area = 18.99(Ac.)

Process from Point/Station 1029.000 to Point/Station 1030.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 11.48 min.
Rainfall intensity = 3.210(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 1.037(CFS) for 0.340(Ac.)
Total runoff = 49.689(CFS) Total area = 19.33(Ac.)

Process from Point/Station 1030.000 to Point/Station 1033.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 478.900(Ft.)
Downstream point/station elevation = 476.200(Ft.)
Pipe length = 447.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 49.689(CFS)
Nearest computed pipe diameter = 36.00(In.)
Calculated individual pipe flow = 49.689(CFS)
Normal flow depth in pipe = 28.27(In.)
Flow top width inside pipe = 29.57(In.)
Critical Depth = 27.53(In.)
Pipe flow velocity = 8.35(Ft/s)
Travel time through pipe = 0.89 min.
Time of concentration (TC) = 12.37 min.

Process from Point/Station 1030.000 to Point/Station 1033.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 19.330(Ac.)

Runoff from this stream = 49.689(CFS)
Time of concentration = 12.37 min.
Rainfall intensity = 3.123(In/Hr)

Process from Point/Station 1042.000 to Point/Station 1043.000
**** INITIAL AREA EVALUATION ****

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
[MULTI - UNITS area type]
Initial subarea flow distance = 211.000(Ft.)
Highest elevation = 502.000(Ft.)
Lowest elevation = 496.500(Ft.)
Elevation difference = 5.500(Ft.)
Time of concentration calculated by the urban
areas overlaid flow method (App X-C) = 7.60 min.
TC = $[1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})]$
TC = $[1.8 * (1.1 - 0.7000) * (211.000^{.5})] / (2.607^{(1/3)}) = 7.60$
Rainfall intensity (I) = 3.730(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.700
Subarea runoff = 0.809(CFS)
Total initial stream area = 0.310(Ac.)

Process from Point/Station 1041.000 to Point/Station 1043.000
**** SUBAREA FLOW ADDITION ****

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
[MULTI - UNITS area type]
Time of concentration = 7.60 min.
Rainfall intensity = 3.730(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.700
Subarea runoff = 1.906(CFS) for 0.730(Ac.)
Total runoff = 2.715(CFS) Total area = 1.04(Ac.)

Process from Point/Station 1043.000 to Point/Station 1044.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 496.500(Ft.)
Downstream point elevation = 487.000(Ft.)
Channel length thru subarea = 1040.000(Ft.)
Channel base width = 2.000(Ft.)
Slope or 'Z' of left channel bank = 2.000
Slope or 'Z' of right channel bank = 2.000
Estimated mean flow rate at midpoint of channel = 24.621(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 2.000(Ft.)
Flow(q) thru subarea = 24.621(CFS)
Depth of flow = 0.947(Ft.), Average velocity = 6.673(Ft/s)
Channel flow top width = 5.790(Ft.)
Flow Velocity = 6.67(Ft/s)

Travel time = 2.60 min.
Time of concentration = 10.20 min.
Critical depth = 1.156(Ft.)
Adding area flow to channel
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
[MULTI - UNITS area type]
Rainfall intensity = 3.350(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.700
Subarea runoff = 39.354(CFS) for 16.780(Ac.)
Total runoff = 42.069(CFS) Total area = 17.82(Ac.)

Process from Point/Station 1044.000 to Point/Station 1032.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 482.000(Ft.)
Downstream point/station elevation = 476.500(Ft.)
Pipe length = 24.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 42.069(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 42.069(CFS)
Normal flow depth in pipe = 12.59(In.)
Flow top width inside pipe = 16.51(In.)
Critical depth could not be calculated.
Pipe flow velocity = 31.86(Ft/s)
Travel time through pipe = 0.01 min.
Time of concentration (TC) = 10.21 min.

Process from Point/Station 1032.000 to Point/Station 1032.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 10.21 min.
Rainfall intensity = 3.349(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 2.068(CFS) for 0.650(Ac.)
Total runoff = 44.137(CFS) Total area = 18.47(Ac.)

Process from Point/Station 1032.000 to Point/Station 1033.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 476.400(Ft.)
Downstream point/station elevation = 476.200(Ft.)
Pipe length = 20.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 44.137(CFS)
Nearest computed pipe diameter = 33.00(In.)
Calculated individual pipe flow = 44.137(CFS)
Normal flow depth in pipe = 23.04(In.)
Flow top width inside pipe = 30.30(In.)

Critical Depth = 26.43(In.)
Pipe flow velocity = 9.96(Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 10.24 min.

Process from Point/Station 1031.000 to Point/Station 1033.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 10.24 min.
Rainfall intensity = 3.345(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 1.430(CFS) for 0.450(Ac.)
Total runoff = 45.567(CFS) Total area = 18.92(Ac.)

Process from Point/Station 1031.000 to Point/Station 1033.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 18.920(Ac.)
Runoff from this stream = 45.567(CFS)
Time of concentration = 10.24 min.
Rainfall intensity = 3.345(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	49.689	12.37	3.123
2	45.567	10.24	3.345
Qmax(1) =	1.000 * 0.934	1.000 * 1.000	49.689) + 45.567) + = 92.232
Qmax(2) =	1.000 * 1.000	0.828 * 1.000	49.689) + 45.567) + = 86.705

Total of 2 streams to confluence:
Flow rates before confluence point:
49.689 45.567
Maximum flow rates at confluence using above data:
92.232 86.705
Area of streams before confluence:
19.330 18.920
Results of confluence:
Total flow rate = 92.232(CFS)
Time of concentration = 12.372 min.
Effective stream area after confluence = 38.250(Ac.)

Process from Point/Station 1033.000 to Point/Station 1040.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 476.200(Ft.)
Downstream point/station elevation = 475.600(Ft.)
Pipe length = 87.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 92.232(CFS)
Nearest computed pipe diameter = 45.00(In.)
Calculated individual pipe flow = 92.232(CFS)
Normal flow depth in pipe = 33.94(In.)
Flow top width inside pipe = 38.75(In.)
Critical Depth = 35.40(In.)
Pipe flow velocity = 10.31(Ft/s)
Travel time through pipe = 0.14 min.
Time of concentration (TC) = 12.51 min.

Process from Point/Station 1033.000 to Point/Station 1040.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 38.250(Ac.)
Runoff from this stream = 92.232(CFS)
Time of concentration = 12.51 min.
Rainfall intensity = 3.110(In/Hr)

Process from Point/Station 1034.000 to Point/Station 1035.000
**** INITIAL AREA EVALUATION ****

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
[MULTI - UNITS area type]
Initial subarea flow distance = 100.000(Ft.)
Highest elevation = 498.000(Ft.)
Lowest elevation = 493.000(Ft.)
Elevation difference = 5.000(Ft.)
Time of concentration calculated by the urban areas overland flow method (App X-C) = 4.21 min.
TC = $[1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})]$
TC = $[1.8 * (1.1 - 0.7000) * (100.000^{.5})] / (5.000^{(1/3)})] = 4.21$
Setting time of concentration to 5 minutes
Rainfall intensity (I) = 4.389(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.700
Subarea runoff = 1.075(CFS)
Total initial stream area = 0.350(Ac.)

Process from Point/Station 1035.000 to Point/Station 1036.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 493.000(Ft.)
Downstream point elevation = 476.500(Ft.)
Channel length thru subarea = 1050.000(Ft.)
Channel base width = 2.000(Ft.)
Slope or 'Z' of left channel bank = 2.000
Slope or 'Z' of right channel bank = 2.000

Estimated mean flow rate at midpoint of channel = 9.294(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 2.000(Ft.)
Flow(q) thru subarea = 9.294(CFS)
Depth of flow = 0.499(Ft.), Average velocity = 6.210(Ft/s)
Channel flow top width = 3.997(Ft.)
Flow Velocity = 6.21(Ft/s)
Travel time = 2.82 min.
Time of concentration = 7.82 min.
Critical depth = 0.688(Ft.)
Adding area flow to channel
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
[MULTI - UNITS area type]
Rainfall intensity = 3.691(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.700
Subarea runoff = 13.822(CFS) for 5.350(Ac.)
Total runoff = 14.898(CFS) Total area = 5.70(Ac.)

Process from Point/Station 1036.000 to Point/Station 1037.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 476.500(Ft.)
Downstream point/station elevation = 476.340(Ft.)
Pipe length = 14.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 14.898(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 14.898(CFS)
Normal flow depth in pipe = 15.28(In.)
Flow top width inside pipe = 18.70(In.)
Critical Depth = 17.16(In.)
Pipe flow velocity = 7.95(Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 7.85 min.

Process from Point/Station 1037.000 to Point/Station 1039.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 476.340(Ft.)
Downstream point/station elevation = 476.280(Ft.)
Pipe length = 6.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 14.898(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 14.898(CFS)
Normal flow depth in pipe = 16.17(In.)
Flow top width inside pipe = 17.67(In.)
Critical Depth = 17.16(In.)
Pipe flow velocity = 7.49(Ft/s)
Travel time through pipe = 0.01 min.
Time of concentration (TC) = 7.86 min.

Process from Point/Station 1037.000 to Point/Station 1039.000
**** SUBAREA FLOW ADDITION ****

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
[MULTI - UNITS area type]
Time of concentration = 7.86 min.
Rainfall intensity = 3.683(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.700
Subarea runoff = 0.464(CFS) for 0.180(Ac.)
Total runoff = 15.362(CFS) Total area = 5.88(Ac.)

Process from Point/Station 1038.000 to Point/Station 1039.000
**** SUBAREA FLOW ADDITION ****

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
[MULTI - UNITS area type]
Time of concentration = 7.86 min.
Rainfall intensity = 3.683(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.700
Subarea runoff = 0.464(CFS) for 0.180(Ac.)
Total runoff = 15.826(CFS) Total area = 6.06(Ac.)

Process from Point/Station 1039.000 to Point/Station 1040.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 476.180(Ft.)
Downstream point/station elevation = 475.600(Ft.)
Pipe length = 66.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 15.826(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 15.826(CFS)
Normal flow depth in pipe = 18.90(In.)
Flow top width inside pipe = 12.60(In.)
Critical Depth = 17.62(In.)
Pipe flow velocity = 6.94(Ft/s)
Travel time through pipe = 0.16 min.
Time of concentration (TC) = 8.02 min.

Process from Point/Station 1039.000 to Point/Station 1040.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 6.060(Ac.)
Runoff from this stream = 15.826(CFS)
Time of concentration = 8.02 min.
Rainfall intensity = 3.656(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
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```
1      92.232      12.51      3.110
2      15.826      8.02      3.656
Qmax(1) =
      1.000 *      1.000 *      92.232) +
      0.851 *      1.000 *      15.826) + =      105.693
Qmax(2) =
      1.000 *      0.641 *      92.232) +
      1.000 *      1.000 *      15.826) + =      74.935
```

Total of 2 streams to confluence:

Flow rates before confluence point:

92.232 15.826

Maximum flow rates at confluence using above data:

105.693 74.935

Area of streams before confluence:

38.250 6.060

Results of confluence:

Total flow rate = 105.693(CFS)

Time of concentration = 12.513 min.

Effective stream area after confluence = 44.310(Ac.)

Process from Point/Station 1040.000 to Point/Station 1052.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 475.500(Ft.)
Downstream point/station elevation = 474.950(Ft.)
Pipe length = 91.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 105.693(CFS)
Nearest computed pipe diameter = 48.00(In.)
Calculated individual pipe flow = 105.693(CFS)
Normal flow depth in pipe = 37.22(In.)
Flow top width inside pipe = 40.06(In.)
Critical Depth = 37.31(In.)
Pipe flow velocity = 10.11(Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 12.66 min.

Process from Point/Station 1050.000 to Point/Station 1052.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 12.66 min.
Rainfall intensity = 3.096(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 2.030(CFS) for 0.690(Ac.)
Total runoff = 107.723(CFS) Total area = 45.00(Ac.)

Process from Point/Station 1051.000 to Point/Station 1052.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 12.66 min.
Rainfall intensity = 3.096(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 1.265(CFS) for 0.430(Ac.)
Total runoff = 108.987(CFS) Total area = 45.43(Ac.)

Process from Point/Station 1052.000 to Point/Station 1049.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 474.850(Ft.)
Downstream point/station elevation = 0.000(Ft.)
Pipe length = 236.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 108.987(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 108.987(CFS)
Normal flow depth in pipe = 11.44(In.)
Flow top width inside pipe = 17.33(In.)
Critical depth could not be calculated.
Pipe flow velocity = 92.08(Ft/s)
Travel time through pipe = 0.04 min.
Time of concentration (TC) = 12.71 min.

Process from Point/Station 1052.000 to Point/Station 1049.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 45.430(Ac.)
Runoff from this stream = 108.987(CFS)
Time of concentration = 12.71 min.
Rainfall intensity = 3.093(In/Hr)

Process from Point/Station 1060.000 to Point/Station 1045.000
**** INITIAL AREA EVALUATION ****

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
[INDUSTRIAL area type]
Initial subarea flow distance = 152.000(Ft.)
Highest elevation = 494.000(Ft.)
Lowest elevation = 487.000(Ft.)
Elevation difference = 7.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) = 2.00 min.
TC = [1.8*(1.1-C)*distance(Ft.)^0.5]/(% slope^(1/3))
TC = [1.8*(1.1-0.9500)*(152.000^0.5)/(4.605^(1/3))]= 2.00
Setting time of concentration to 5 minutes
Rainfall intensity (I) = 4.389(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950

Subarea runoff = 1.251(CFS)
Total initial stream area = 0.300(Ac.)

Process from Point/Station 1045.000 to Point/Station 1047.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 483.300(Ft.)
Downstream point/station elevation = 482.900(Ft.)
Pipe length = 6.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.251(CFS)
Nearest computed pipe diameter = 6.00(In.)
Calculated individual pipe flow = 1.251(CFS)
Normal flow depth in pipe = 4.30(In.)
Flow top width inside pipe = 5.41(In.)
Critical depth could not be calculated.
Pipe flow velocity = 8.30(Ft/s)
Travel time through pipe = 0.01 min.
Time of concentration (TC) = 5.01 min.

Process from Point/Station 1046.000 to Point/Station 1047.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 5.01 min.
Rainfall intensity = 4.385(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 0.833(CFS) for 0.200(Ac.)
Total runoff = 2.084(CFS) Total area = 0.50(Ac.)

Process from Point/Station 1047.000 to Point/Station 1049.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 482.530(Ft.)
Downstream point/station elevation = 473.500(Ft.)
Pipe length = 260.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.084(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 2.084(CFS)
Normal flow depth in pipe = 5.42(In.)
Flow top width inside pipe = 8.81(In.)
Critical Depth = 7.83(In.)
Pipe flow velocity = 7.49(Ft/s)
Travel time through pipe = 0.58 min.
Time of concentration (TC) = 5.59 min.

Process from Point/Station 1047.000 to Point/Station 1049.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2

Stream flow area = 0.500(Ac.)
Runoff from this stream = 2.084(CFS)
Time of concentration = 5.59 min.
Rainfall intensity = 4.196(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	108.987	12.71	3.093
2	2.084	5.59	4.196
Qmax(1) =	1.000 * 1.000 * 108.987) + 0.737 * 1.000 * 2.084) + =		110.523
Qmax(2) =	1.000 * 0.440 * 108.987) + 1.000 * 1.000 * 2.084) + =		50.037

Total of 2 streams to confluence:
Flow rates before confluence point:
108.987 2.084
Maximum flow rates at confluence using above data:
110.523 50.037
Area of streams before confluence:
45.430 0.500
Results of confluence:
Total flow rate = 110.523(CFS)
Time of concentration = 12.706 min.
Effective stream area after confluence = 45.930(Ac.)

Process from Point/Station 1049.000 to Point/Station 1066.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 473.330(Ft.)
Downstream point/station elevation = 467.000(Ft.)
Pipe length = 516.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 110.523(CFS)
Nearest computed pipe diameter = 42.00(In.)
Calculated individual pipe flow = 110.523(CFS)
Normal flow depth in pipe = 34.13(In.)
Flow top width inside pipe = 32.79(In.)
Critical Depth = 38.10(In.)
Pipe flow velocity = 13.20(Ft/s)
Travel time through pipe = 0.65 min.
Time of concentration (TC) = 13.36 min.

Process from Point/Station 1064.000 to Point/Station 1066.000
**** SUBAREA FLOW ADDITION ****

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
[MULTI - UNITS area type]
Time of concentration = 13.36 min.
Rainfall intensity = 3.036(In/Hr) for a 100.0 year storm

Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.700
Subarea runoff = 26.902(CFS) for 12.660(Ac.)
Total runoff = 137.425(CFS) Total area = 58.59(Ac.)

Process from Point/Station 1049.000 to Point/Station 1066.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
Stream flow area = 58.590(Ac.)
Runoff from this stream = 137.425(CFS)
Time of concentration = 13.36 min.
Rainfall intensity = 3.036(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 1067.000 to Point/Station 1055.000
**** INITIAL AREA EVALUATION ****

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
[INDUSTRIAL area type]
Initial subarea flow distance = 300.000(Ft.)
Highest elevation = 508.000(Ft.)
Lowest elevation = 504.000(Ft.)
Elevation difference = 4.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) = 4.25 min.
TC = $[1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})]$
TC = $[1.8 * (1.1 - 0.9500) * (300.000^{.5})] / (1.333^{(1/3)})] = 4.25$
Setting time of concentration to 5 minutes
Rainfall intensity (I) = 4.389(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff = 1.876(CFS)
Total initial stream area = 0.450(Ac.)

Process from Point/Station 1055.000 to Point/Station 1057.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 499.000(Ft.)
Downstream point/station elevation = 498.900(Ft.)
Pipe length = 9.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.876(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.876(CFS)
Normal flow depth in pipe = 6.00(In.)
Flow top width inside pipe = 12.00(In.)
Critical Depth = 7.00(In.)
Pipe flow velocity = 4.78(Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 5.03 min.

Process from Point/Station 1056.000 to Point/Station 1057.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 5.03 min.
Rainfall intensity = 4.378(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 4.201(CFS) for 1.010(Ac.)
Total runoff = 6.077(CFS) Total area = 1.46(Ac.)

Process from Point/Station 1057.000 to Point/Station 1058.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 498.600(Ft.)
Downstream point/station elevation = 488.800(Ft.)
Pipe length = 477.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.077(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 6.077(CFS)
Normal flow depth in pipe = 8.86(In.)
Flow top width inside pipe = 14.75(In.)
Critical Depth = 11.95(In.)
Pipe flow velocity = 8.05(Ft/s)
Travel time through pipe = 0.99 min.
Time of concentration (TC) = 6.02 min.

Process from Point/Station 1057.000 to Point/Station 1058.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 6.02 min.
Rainfall intensity = 4.076(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 2.788(CFS) for 0.720(Ac.)
Total runoff = 8.865(CFS) Total area = 2.18(Ac.)

Process from Point/Station 1059.000 to Point/Station 1058.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 6.02 min.
Rainfall intensity = 4.076(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950

Subarea runoff = 2.362(CFS) for 0.610(Ac.)
Total runoff = 11.226(CFS) Total area = 2.79(Ac.)

Process from Point/Station 1058.000 to Point/Station 1063.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 488.360(Ft.)
Downstream point/station elevation = 470.560(Ft.)
Pipe length = 693.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.226(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 11.226(CFS)
Normal flow depth in pipe = 10.75(In.)
Flow top width inside pipe = 17.66(In.)
Critical Depth = 15.37(In.)
Pipe flow velocity = 10.20(Ft/s)
Travel time through pipe = 1.13 min.
Time of concentration (TC) = 7.15 min.

Process from Point/Station 1062.000 to Point/Station 1063.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 7.15 min.
Rainfall intensity = 3.815(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 3.371(CFS) for 0.930(Ac.)
Total runoff = 14.597(CFS) Total area = 3.72(Ac.)

Process from Point/Station 1063.000 to Point/Station 1061.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 470.230(Ft.)
Downstream point/station elevation = 470.000(Ft.)
Pipe length = 19.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 14.597(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 14.597(CFS)
Normal flow depth in pipe = 14.70(In.)
Flow top width inside pipe = 19.25(In.)
Critical Depth = 17.01(In.)
Pipe flow velocity = 8.12(Ft/s)
Travel time through pipe = 0.04 min.
Time of concentration (TC) = 7.19 min.

Process from Point/Station 1060.000 to Point/Station 1061.000
**** SUBAREA FLOW ADDITION ****

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
[INDUSTRIAL area type]
Time of concentration = 7.19 min.
Rainfall intensity = 3.808(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.950
Subarea runoff = 3.907(CFS) for 1.080(Ac.)
Total runoff = 18.504(CFS) Total area = 4.80(Ac.)

Process from Point/Station 1061.000 to Point/Station 1066.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 469.710(Ft.)
Downstream point/station elevation = 467.000(Ft.)
Pipe length = 52.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 18.504(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 18.504(CFS)
Normal flow depth in pipe = 11.86(In.)
Flow top width inside pipe = 17.07(In.)
Critical depth could not be calculated.
Pipe flow velocity = 14.97(Ft/s)
Travel time through pipe = 0.06 min.
Time of concentration (TC) = 7.25 min.

Process from Point/Station 1061.000 to Point/Station 1066.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
Stream flow area = 4.800(Ac.)
Runoff from this stream = 18.504(CFS)
Time of concentration = 7.25 min.
Rainfall intensity = 3.796(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	137.425	13.36	3.036
2	18.504	7.25	3.796
Qmax(1) =	1.000 * 0.800 *	1.000 * 1.000 *	137.425) + 18.504) + = 152.222
Qmax(2) =	1.000 * 1.000 *	0.543 * 1.000 *	137.425) + 18.504) + = 93.081

Total of 2 main streams to confluence:

Flow rates before confluence point:

137.425 18.504

Maximum flow rates at confluence using above data:

152.222 93.081

Area of streams before confluence:

58.590 4.800

Results of confluence:

Total flow rate = 152.222(CFS)
Time of concentration = 13.357 min.
Effective stream area after confluence = 63.390(Ac.)

Process from Point/Station 1066.000 to Point/Station 1066.000
**** SUBAREA FLOW ADDITION ****

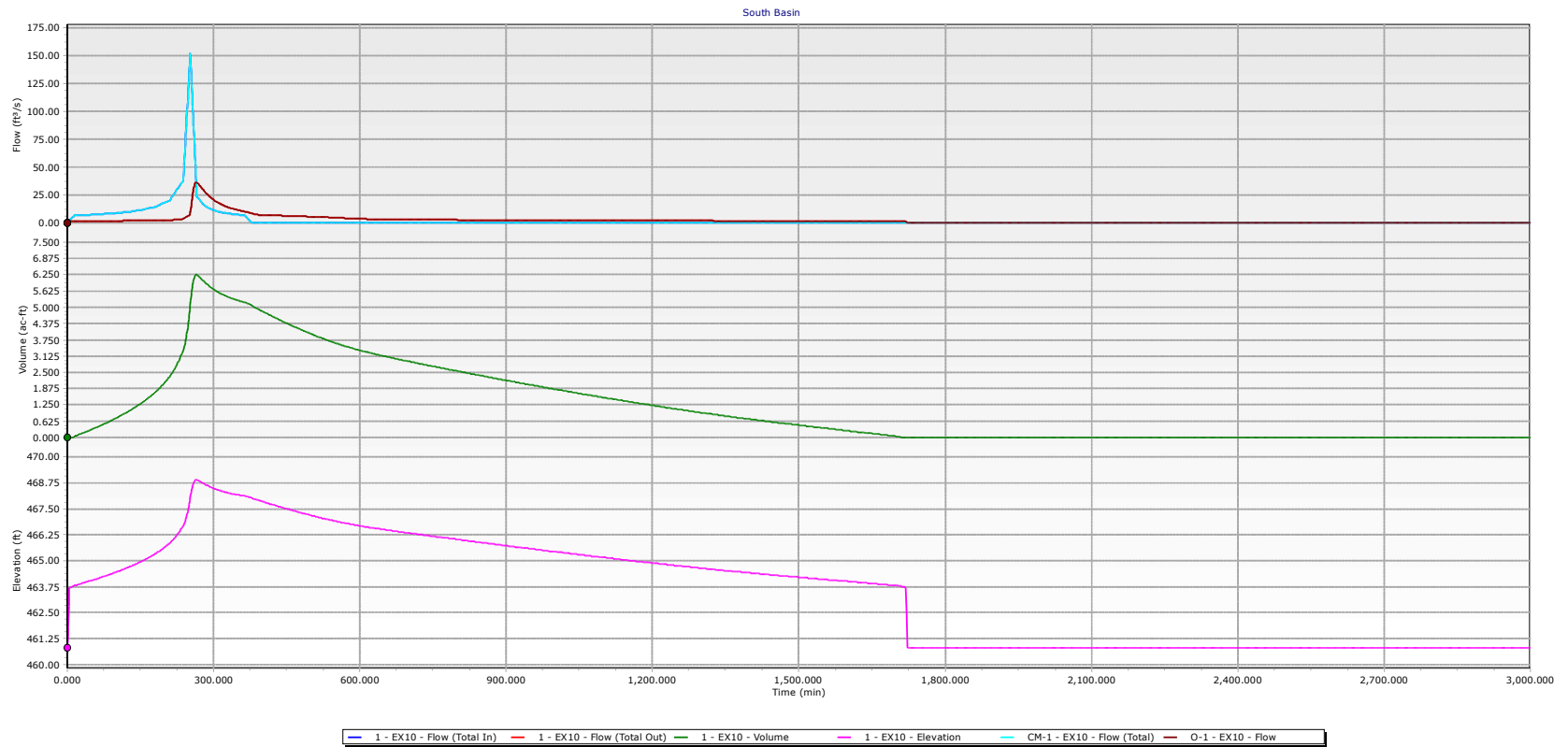
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration = 13.36 min.
Rainfall intensity = 3.036(In/Hr) for a 100.0 year storm
Runoff coefficient used for sub-area, Rational method, Q=KCIA, C = 0.450
Subarea runoff = 0.000(CFS) for 0.000(Ac.)
Total runoff = 152.222(CFS) Total area = 63.39(Ac.)

Process from Point/Station 1066.000 to Point/Station 1066.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 465.500(Ft.)
Downstream point/station elevation = 430.000(Ft.)
Pipe length = 264.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 152.222(CFS)
Nearest computed pipe diameter = 30.00(In.)
Calculated individual pipe flow = 152.222(CFS)
Normal flow depth in pipe = 24.94(In.)
Flow top width inside pipe = 22.47(In.)
Critical depth could not be calculated.
Pipe flow velocity = 34.91(Ft/s)
Travel time through pipe = 0.13 min.
Time of concentration (TC) = 13.48 min.
End of computations, total study area = 63.390 (Ac.)

APPENDIX 2

Detention Calculations



RUN DATE 9/30/2019
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 14 MIN.
6 HOUR RAINFALL 2.2 INCHES
BASIN AREA 63.4 ACRES
RUNOFF COEFFICIENT 0.785
PEAK DISCHARGE 152.2 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 14	DISCHARGE (CFS) = 6.5
TIME (MIN) = 28	DISCHARGE (CFS) = 6.9
TIME (MIN) = 42	DISCHARGE (CFS) = 7.1
TIME (MIN) = 56	DISCHARGE (CFS) = 7.5
TIME (MIN) = 70	DISCHARGE (CFS) = 7.8
TIME (MIN) = 84	DISCHARGE (CFS) = 8.3
TIME (MIN) = 98	DISCHARGE (CFS) = 8.6
TIME (MIN) = 112	DISCHARGE (CFS) = 9.4
TIME (MIN) = 126	DISCHARGE (CFS) = 9.8
TIME (MIN) = 140	DISCHARGE (CFS) = 10.9
TIME (MIN) = 154	DISCHARGE (CFS) = 11.6
TIME (MIN) = 168	DISCHARGE (CFS) = 13.3
TIME (MIN) = 182	DISCHARGE (CFS) = 14.4
TIME (MIN) = 196	DISCHARGE (CFS) = 17.6
TIME (MIN) = 210	DISCHARGE (CFS) = 20
TIME (MIN) = 224	DISCHARGE (CFS) = 29.4
TIME (MIN) = 238	DISCHARGE (CFS) = 37.7
TIME (MIN) = 252	DISCHARGE (CFS) = 152.2
TIME (MIN) = 266	DISCHARGE (CFS) = 23.6
TIME (MIN) = 280	DISCHARGE (CFS) = 15.8
TIME (MIN) = 294	DISCHARGE (CFS) = 12.3
TIME (MIN) = 308	DISCHARGE (CFS) = 10.3
TIME (MIN) = 322	DISCHARGE (CFS) = 9
TIME (MIN) = 336	DISCHARGE (CFS) = 8
TIME (MIN) = 350	DISCHARGE (CFS) = 7.3
TIME (MIN) = 364	DISCHARGE (CFS) = 6.7
TIME (MIN) = 378	DISCHARGE (CFS) = 0

South Basin

Project Summary	
Title	South Basin
Engineer	PDC
Company	PDC
Date	9/24/2019
Notes	

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South Basin

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft ³ /s)
CM-1	EX10	0	9.098	252.000	152.20

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft ³ /s)
O-1	EX10	0	9.098	265.000	36.74

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	9.098	252.000	152.20	(N/A)	(N/A)
1 (OUT)	EX10	0	9.098	265.000	36.74	468.90	6.258

South Basin

Subsection: Read Hydrograph
Label: CM-1

Return Event: 100 years
Storm Event:

Peak Discharge	152.20 ft ³ /s
Time to Peak	252.000 min
Hydrograph Volume	9.098 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 14.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	6.50	6.90	7.00	7.50
70.000	7.70	8.30	8.60	9.40	9.80
140.000	10.90	11.60	13.30	14.40	17.60
210.000	20.00	29.40	37.70	152.20	23.60
280.000	15.80	12.30	10.30	9.00	8.00
350.000	7.30	6.70	0.00	(N/A)	(N/A)

South Basin

Subsection: Elevation-Area Volume Curve

Return Event: 100 years

Label: 1

Storm Event:

Elevation (ft)	Planimeter (ft ²)	Area (ft ²)	A1+A2+sqr (A1*A2) (ft ²)	Volume (ac-ft)	Volume (Total) (ac-ft)
460.80	0.0	10.000	0.000	0.000	0.000
463.70	0.0	10.000	30.000	0.001	0.001
463.80	0.0	46,285.000	46,975.331	0.036	0.037
474.00	0.0	76,427.000	182,188.245	14.220	14.257

South Basin

Subsection: Outlet Input Data

Label: Outlet#1

Return Event: 100 years

Storm Event:

Requested Pond Water Surface Elevations

Minimum (Headwater)	460.80 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	474.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	1-Lowflow orifice	Forward	TW	464.30	474.00
Orifice-Circular	2-Midflow orifice	Forward	TW	466.30	474.00
Stand Pipe	Riser - 1	Forward	TW	467.90	474.00
Orifice-Circular	0- Underdrain orifice	Forward	TW	461.05	474.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

South Basin

Subsection: Outlet Input Data

Label: Outlet#1

Return Event: 100 years

Storm Event:

Structure ID: 0-Underdrain orifice	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	461.05 ft
Orifice Diameter	6.0 in
Orifice Coefficient	0.600
Structure ID: 2-Midflow orifice	
Structure Type: Orifice-Circular	
Number of Openings	2
Elevation	466.30 ft
Orifice Diameter	8.0 in
Orifice Coefficient	0.600
Structure ID: Riser - 1	
Structure Type: Stand Pipe	
Number of Openings	1
Elevation	467.90 ft
Diameter	36.0 in
Orifice Area	7.1 ft ²
Orifice Coefficient	0.600
Weir Length	9.42 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True
Structure ID: 1-Lowflow orifice	
Structure Type: Orifice-Circular	
Number of Openings	2
Elevation	464.30 ft
Orifice Diameter	3.0 in
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30

South Basin

Subsection: Outlet Input Data

Label: Outlet#1

Return Event: 100 years

Storm Event:

Convergence Tolerances	
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
460.80	0.00	(N/A)	0.00
460.90	0.00	(N/A)	0.00
461.00	0.00	(N/A)	0.00
461.05	0.00	(N/A)	0.00
461.10	0.01	(N/A)	0.00
461.20	0.05	(N/A)	0.00
461.30	0.13	(N/A)	0.00
461.40	0.25	(N/A)	0.00
461.50	0.38	(N/A)	0.00
461.60	0.52	(N/A)	0.00
461.70	0.60	(N/A)	0.00
461.80	0.67	(N/A)	0.00
461.90	0.73	(N/A)	0.00
462.00	0.79	(N/A)	0.00
462.10	0.85	(N/A)	0.00
462.20	0.90	(N/A)	0.00
462.30	0.95	(N/A)	0.00
462.40	0.99	(N/A)	0.00
462.50	1.04	(N/A)	0.00
462.60	1.08	(N/A)	0.00
462.70	1.12	(N/A)	0.00
462.80	1.16	(N/A)	0.00
462.90	1.20	(N/A)	0.00
463.00	1.23	(N/A)	0.00
463.10	1.27	(N/A)	0.00
463.20	1.30	(N/A)	0.00
463.30	1.34	(N/A)	0.00
463.40	1.37	(N/A)	0.00
463.50	1.40	(N/A)	0.00
463.60	1.43	(N/A)	0.00
463.70	1.46	(N/A)	0.00
463.80	1.49	(N/A)	0.00
463.90	1.52	(N/A)	0.00
464.00	1.55	(N/A)	0.00
464.10	1.58	(N/A)	0.00
464.20	1.61	(N/A)	0.00
464.30	1.64	(N/A)	0.00
464.40	1.70	(N/A)	0.00
464.50	1.80	(N/A)	0.00
464.60	1.91	(N/A)	0.00
464.70	1.99	(N/A)	0.00
464.80	2.06	(N/A)	0.00
464.90	2.12	(N/A)	0.00

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
465.00	2.18	(N/A)	0.00
465.10	2.23	(N/A)	0.00
465.20	2.28	(N/A)	0.00
465.30	2.33	(N/A)	0.00
465.40	2.38	(N/A)	0.00
465.50	2.43	(N/A)	0.00
465.60	2.47	(N/A)	0.00
465.70	2.52	(N/A)	0.00
465.80	2.56	(N/A)	0.00
465.90	2.60	(N/A)	0.00
466.00	2.64	(N/A)	0.00
466.10	2.68	(N/A)	0.00
466.20	2.72	(N/A)	0.00
466.30	2.76	(N/A)	0.00
466.40	2.85	(N/A)	0.00
466.50	3.05	(N/A)	0.00
466.60	3.33	(N/A)	0.00
466.70	3.68	(N/A)	0.00
466.80	4.10	(N/A)	0.00
466.90	4.56	(N/A)	0.00
467.00	5.05	(N/A)	0.00
467.10	5.34	(N/A)	0.00
467.20	5.61	(N/A)	0.00
467.30	5.86	(N/A)	0.00
467.40	6.09	(N/A)	0.00
467.50	6.31	(N/A)	0.00
467.60	6.52	(N/A)	0.00
467.70	6.72	(N/A)	0.00
467.80	6.91	(N/A)	0.00
467.90	7.09	(N/A)	0.00
468.00	8.16	(N/A)	0.00
468.10	9.97	(N/A)	0.00
468.20	12.25	(N/A)	0.00
468.30	14.92	(N/A)	0.00
468.40	17.92	(N/A)	0.00
468.50	21.22	(N/A)	0.00
468.60	24.79	(N/A)	0.00
468.70	28.61	(N/A)	0.00
468.80	32.66	(N/A)	0.00
468.90	36.94	(N/A)	0.00
469.00	41.42	(N/A)	0.00
469.10	46.11	(N/A)	0.00
469.20	47.86	(N/A)	0.00

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
469.30	49.46	(N/A)	0.00
469.40	51.00	(N/A)	0.00
469.50	52.49	(N/A)	0.00
469.60	53.94	(N/A)	0.00
469.70	55.35	(N/A)	0.00
469.80	56.73	(N/A)	0.00
469.90	58.06	(N/A)	0.00
470.00	59.37	(N/A)	0.00
470.10	60.65	(N/A)	0.00
470.20	61.90	(N/A)	0.00
470.30	63.12	(N/A)	0.00
470.40	64.32	(N/A)	0.00
470.50	65.50	(N/A)	0.00
470.60	66.65	(N/A)	0.00
470.70	67.79	(N/A)	0.00
470.80	68.90	(N/A)	0.00
470.90	70.00	(N/A)	0.00
471.00	71.08	(N/A)	0.00
471.10	72.14	(N/A)	0.00
471.20	73.19	(N/A)	0.00
471.30	74.22	(N/A)	0.00
471.40	75.24	(N/A)	0.00
471.50	76.24	(N/A)	0.00
471.60	77.23	(N/A)	0.00
471.70	78.21	(N/A)	0.00
471.80	79.17	(N/A)	0.00
471.90	80.12	(N/A)	0.00
472.00	81.06	(N/A)	0.00
472.10	81.99	(N/A)	0.00
472.20	82.91	(N/A)	0.00
472.30	83.82	(N/A)	0.00
472.40	84.72	(N/A)	0.00
472.50	85.61	(N/A)	0.00
472.60	86.49	(N/A)	0.00
472.70	87.36	(N/A)	0.00
472.80	88.23	(N/A)	0.00
472.90	89.08	(N/A)	0.00
473.00	89.93	(N/A)	0.00
473.10	90.76	(N/A)	0.00
473.20	91.59	(N/A)	0.00
473.30	92.42	(N/A)	0.00
473.40	93.23	(N/A)	0.00
473.50	94.04	(N/A)	0.00

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
473.60	94.84	(N/A)	0.00
473.70	95.63	(N/A)	0.00
473.80	96.42	(N/A)	0.00
473.90	97.20	(N/A)	0.00
474.00	97.98	(N/A)	0.00

Contributing Structures

[illegible]

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
0-Underdrain orifice
1-Lowflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 0-Underdrain orifice
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1-Lowflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

[illegible]

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

[illegible]

South Basin

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice
1-Lowflow orifice + 2-Midflow orifice + Riser - 1 + 0-Underdrain orifice

South Basin

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 100 years

Label: 1

Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	460.80 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
460.80	0.00	0.000	10.000	0.00	0.00	0.00
460.90	0.00	0.000	10.000	0.00	0.00	0.03
461.00	0.00	0.000	10.000	0.00	0.00	0.07
461.05	0.00	0.000	10.000	0.00	0.00	0.08
461.10	0.01	0.000	10.000	0.00	0.01	0.11
461.20	0.05	0.000	10.000	0.00	0.05	0.19
461.30	0.13	0.000	10.000	0.00	0.13	0.30
461.40	0.25	0.000	10.000	0.00	0.25	0.45
461.50	0.38	0.000	10.000	0.00	0.38	0.62
461.60	0.52	0.000	10.000	0.00	0.52	0.78
461.70	0.60	0.000	10.000	0.00	0.60	0.90
461.80	0.67	0.000	10.000	0.00	0.67	1.00
461.90	0.73	0.000	10.000	0.00	0.73	1.10
462.00	0.79	0.000	10.000	0.00	0.79	1.19
462.10	0.85	0.000	10.000	0.00	0.85	1.28
462.20	0.90	0.000	10.000	0.00	0.90	1.36
462.30	0.95	0.000	10.000	0.00	0.95	1.45
462.40	0.99	0.000	10.000	0.00	0.99	1.52
462.50	1.04	0.000	10.000	0.00	1.04	1.60
462.60	1.08	0.000	10.000	0.00	1.08	1.68
462.70	1.12	0.000	10.000	0.00	1.12	1.75
462.80	1.16	0.000	10.000	0.00	1.16	1.82
462.90	1.20	0.000	10.000	0.00	1.20	1.90
463.00	1.23	0.001	10.000	0.00	1.23	1.97
463.10	1.27	0.001	10.000	0.00	1.27	2.03
463.20	1.30	0.001	10.000	0.00	1.30	2.10
463.30	1.34	0.001	10.000	0.00	1.34	2.17
463.40	1.37	0.001	10.000	0.00	1.37	2.24
463.50	1.40	0.001	10.000	0.00	1.40	2.30

South Basin

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 100 years

Label: 1

Storm Event:

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
463.60	1.43	0.001	10.000	0.00	1.43	2.37
463.70	1.46	0.001	10.000	0.00	1.46	2.43
463.80	1.49	0.037	46,285.000	0.00	1.49	54.66
463.90	1.52	0.143	46,544.013	0.00	1.52	209.40
464.00	1.55	0.250	46,803.749	0.00	1.55	365.01
464.10	1.58	0.358	47,064.208	0.00	1.58	521.48
464.20	1.61	0.466	47,325.389	0.00	1.61	678.83
464.30	1.64	0.575	47,587.293	0.00	1.64	837.04
464.40	1.70	0.685	47,849.920	0.00	1.70	996.16
464.50	1.80	0.795	48,113.269	0.00	1.80	1,156.21
464.60	1.91	0.906	48,377.341	0.00	1.91	1,317.14
464.70	1.99	1.017	48,642.136	0.00	1.99	1,478.91
464.80	2.06	1.129	48,907.654	0.00	2.06	1,641.56
464.90	2.12	1.242	49,173.894	0.00	2.12	1,805.09
465.00	2.18	1.355	49,440.857	0.00	2.18	1,969.51
465.10	2.23	1.469	49,708.543	0.00	2.23	2,134.81
465.20	2.28	1.583	49,976.951	0.00	2.28	2,301.01
465.30	2.33	1.698	50,246.082	0.00	2.33	2,468.09
465.40	2.38	1.814	50,515.936	0.00	2.38	2,636.08
465.50	2.43	1.930	50,786.512	0.00	2.43	2,804.96
465.60	2.47	2.047	51,057.812	0.00	2.47	2,974.75
465.70	2.52	2.165	51,329.834	0.00	2.52	3,145.44
465.80	2.56	2.283	51,602.578	0.00	2.56	3,317.03
465.90	2.60	2.401	51,876.045	0.00	2.60	3,489.54
466.00	2.64	2.521	52,150.235	0.00	2.64	3,662.96
466.10	2.68	2.641	52,425.148	0.00	2.68	3,837.29
466.20	2.72	2.762	52,700.784	0.00	2.72	4,012.54
466.30	2.76	2.883	52,977.142	0.00	2.76	4,188.71
466.40	2.85	3.005	53,254.223	0.00	2.85	4,365.85
466.50	3.05	3.127	53,532.026	0.00	3.05	4,544.02
466.60	3.33	3.251	53,810.552	0.00	3.33	4,723.21
466.70	3.68	3.374	54,089.801	0.00	3.68	4,903.40
466.80	4.10	3.499	54,369.773	0.00	4.10	5,084.58
466.90	4.56	3.624	54,650.467	0.00	4.56	5,266.74
467.00	5.05	3.750	54,931.884	0.00	5.05	5,449.87
467.10	5.34	3.876	55,214.024	0.00	5.34	5,633.74
467.20	5.61	4.003	55,496.887	0.00	5.61	5,818.52
467.30	5.86	4.131	55,780.472	0.00	5.86	6,004.23
467.40	6.09	4.259	56,064.780	0.00	6.09	6,190.87
467.50	6.31	4.389	56,349.810	0.00	6.31	6,378.45
467.60	6.52	4.518	56,635.564	0.00	6.52	6,566.97
467.70	6.72	4.649	56,922.039	0.00	6.72	6,756.43
467.80	6.91	4.780	57,209.238	0.00	6.91	6,946.84

South Basin

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 100 years

Label: 1

Storm Event:

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
467.90	7.09	4.911	57,497.160	0.00	7.09	7,138.20
468.00	8.16	5.044	57,785.804	0.00	8.16	7,331.41
468.10	9.97	5.177	58,075.171	0.00	9.97	7,526.31
468.20	12.25	5.310	58,365.260	0.00	12.25	7,722.67
468.30	14.92	5.445	58,656.072	0.00	14.92	7,920.37
468.40	17.92	5.580	58,947.607	0.00	17.92	8,119.38
468.50	21.22	5.715	59,239.865	0.00	21.22	8,319.65
468.60	24.79	5.852	59,532.845	0.00	24.79	8,521.18
468.70	28.61	5.989	59,826.548	0.00	28.61	8,723.93
468.80	32.66	6.126	60,120.974	0.00	32.66	8,927.90
468.90	36.94	6.265	60,416.122	0.00	36.94	9,133.07
469.00	41.42	6.404	60,711.994	0.00	41.42	9,339.43
469.10	46.11	6.543	61,008.587	0.00	46.11	9,546.98
469.20	47.86	6.684	61,305.904	0.00	47.86	9,752.59
469.30	49.46	6.825	61,603.943	0.00	49.46	9,959.04
469.40	51.00	6.967	61,902.705	0.00	51.00	10,166.43
469.50	52.49	7.109	62,202.190	0.00	52.49	10,374.76
469.60	53.94	7.252	62,502.397	0.00	53.94	10,584.05
469.70	55.35	7.396	62,803.327	0.00	55.35	10,794.30
469.80	56.73	7.540	63,104.980	0.00	56.73	11,005.52
469.90	58.06	7.686	63,407.356	0.00	58.06	11,217.71
470.00	59.37	7.832	63,710.454	0.00	59.37	11,430.88
470.10	60.65	7.978	64,014.275	0.00	60.65	11,645.04
470.20	61.90	8.126	64,318.818	0.00	61.90	11,860.17
470.30	63.12	8.274	64,624.085	0.00	63.12	12,076.30
470.40	64.32	8.422	64,930.074	0.00	64.32	12,293.42
470.50	65.50	8.572	65,236.785	0.00	65.50	12,511.55
470.60	66.65	8.722	65,544.220	0.00	66.65	12,730.67
470.70	67.79	8.873	65,852.377	0.00	67.79	12,950.80
470.80	68.90	9.024	66,161.257	0.00	68.90	13,171.93
470.90	70.00	9.176	66,470.859	0.00	70.00	13,394.08
471.00	71.08	9.329	66,781.185	0.00	71.08	13,617.25
471.10	72.14	9.483	67,092.233	0.00	72.14	13,841.44
471.20	73.19	9.637	67,404.003	0.00	73.19	14,066.64
471.30	74.22	9.792	67,716.497	0.00	74.22	14,292.87
471.40	75.24	9.948	68,029.713	0.00	75.24	14,520.14
471.50	76.24	10.105	68,343.652	0.00	76.24	14,748.43
471.60	77.23	10.262	68,658.313	0.00	77.23	14,977.75
471.70	78.21	10.420	68,973.697	0.00	78.21	15,208.12
471.80	79.17	10.579	69,289.804	0.00	79.17	15,439.52
471.90	80.12	10.738	69,606.634	0.00	80.12	15,671.97
472.00	81.06	10.898	69,924.186	0.00	81.06	15,905.46
472.10	81.99	11.059	70,242.461	0.00	81.99	16,140.00

South Basin

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 100 years

Label: 1

Storm Event:

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
472.20	82.91	11.221	70,561.459	0.00	82.91	16,375.59
472.30	83.82	11.383	70,881.179	0.00	83.82	16,612.24
472.40	84.72	11.546	71,201.622	0.00	84.72	16,849.94
472.50	85.61	11.710	71,522.788	0.00	85.61	17,088.71
472.60	86.49	11.875	71,844.677	0.00	86.49	17,328.53
472.70	87.36	12.040	72,167.288	0.00	87.36	17,569.42
472.80	88.23	12.206	72,490.622	0.00	88.23	17,811.38
472.90	89.08	12.373	72,814.678	0.00	89.08	18,054.41
473.00	89.93	12.540	73,139.458	0.00	89.93	18,298.51
473.10	90.76	12.709	73,464.960	0.00	90.76	18,543.69
473.20	91.59	12.878	73,791.185	0.00	91.59	18,789.95
473.30	92.42	13.047	74,118.132	0.00	92.42	19,037.29
473.40	93.23	13.218	74,445.802	0.00	93.23	19,285.71
473.50	94.04	13.389	74,774.195	0.00	94.04	19,535.22
473.60	94.84	13.561	75,103.311	0.00	94.84	19,785.81
473.70	95.63	13.734	75,433.149	0.00	95.63	20,037.50
473.80	96.42	13.908	75,763.710	0.00	96.42	20,290.28
473.90	97.20	14.082	76,094.994	0.00	97.20	20,544.16
474.00	97.98	14.257	76,427.000	0.00	97.98	20,799.14

South Basin

Subsection: Level Pool Pond Routing Summary

Label: 1 (IN)

Return Event: 100 years

Storm Event:

Infiltration			
Infiltration Method (Computed)		No Infiltration	
Initial Conditions			
Elevation (Water Surface, Initial)	460.80 ft		
Volume (Initial)	0.000 ac-ft		
Flow (Initial Outlet)	0.00 ft³/s		
Flow (Initial Infiltration)	0.00 ft³/s		
Flow (Initial, Total)	0.00 ft³/s		
Time Increment	1.000 min		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	152.20 ft³/s	Time to Peak (Flow, In)	252.000 min
Flow (Peak Outlet)	36.74 ft³/s	Time to Peak (Flow, Outlet)	265.000 min
Peak Conditions			
Elevation (Water Surface, Peak)	468.90 ft		
Volume (Peak)	6.258 ac-ft		
Mass Balance (ac-ft)			
Volume (Initial)	0.000 ac-ft		
Volume (Total Inflow)	9.098 ac-ft		
Volume (Total Infiltration)	0.000 ac-ft		
Volume (Total Outlet Outflow)	9.098 ac-ft		
Volume (Retained)	0.000 ac-ft		
Volume (Unrouted)	0.000 ac-ft		
Error (Mass Balance)	0.0 %		

South Basin

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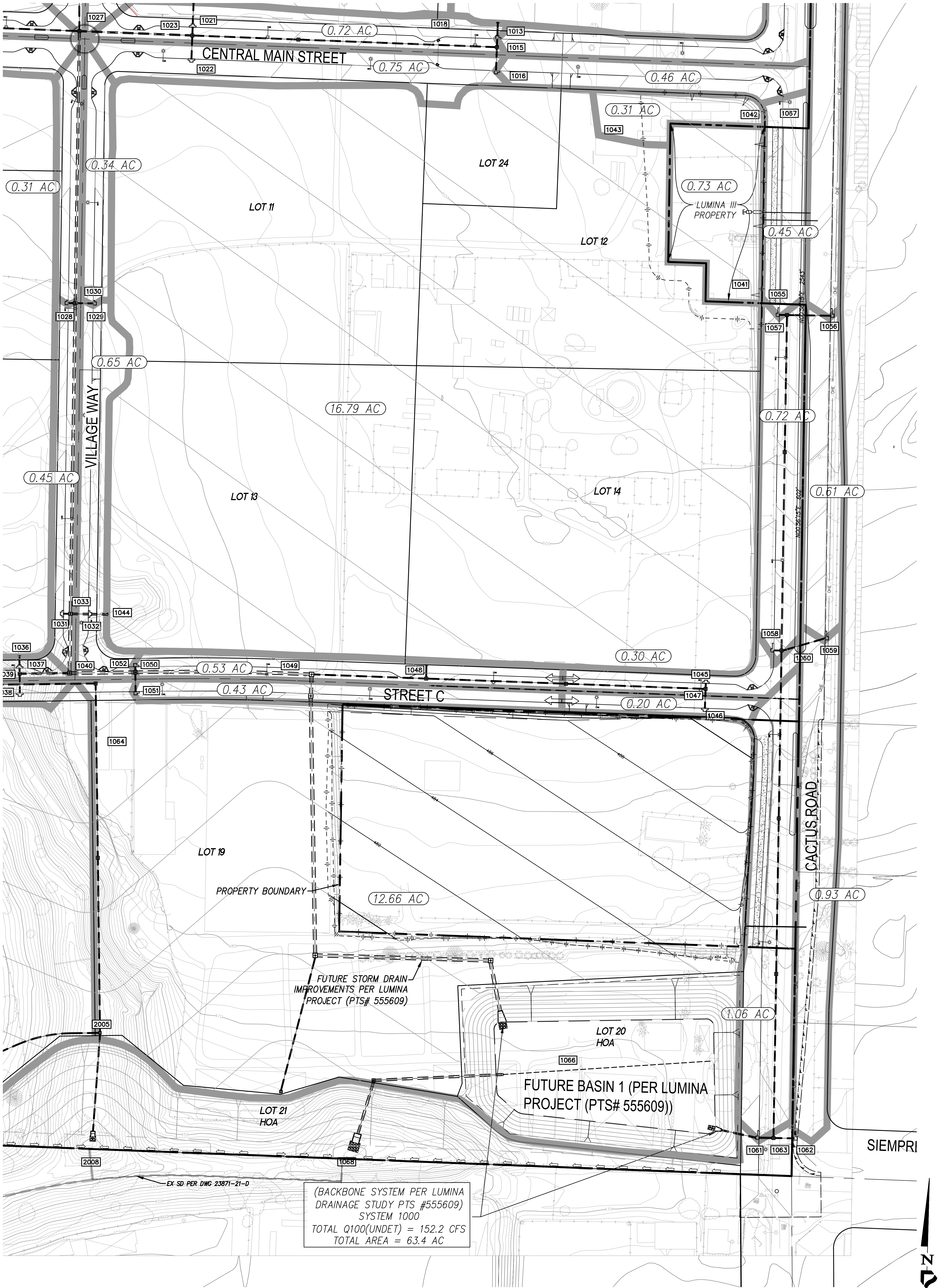
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APPENDIX 3

Drainage Exhibit



SCALE 1' = 60'

NOTE: SUPPLEMENTAL TOPOGRAPHY IS 2-FT CONTOURS FROM SANGIS (1997, BEFORE SR 905 WAS BUILT)

LEGEND

PROPERTY BOUNDARY	--- --	HYDROLOGY NODE	⬮
DRAINAGE SUBAREA	▬	AREA FROM UPSTREAM TO DOWNSTREAM NODE	(X.XX AC)
FLOW DIRECTION	→		

SCALE: 1"=60'
JOB #: 2357.60
CREATED: 8/7/19

PREPARED BY:

PROJECT DESIGN CONSULTANTS
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CITY OF SAN DIEGO
LUMINA III
DRAINAGE MAP
PROPOSED CONDITIONS
EXHIBIT B