M3-PN120085
Revision 0

ARCHITECTURE
ENGINEERING
CONSTRUCTION MANAGEMENT

Copper Flat Project

Site Diversion Analysis Report

Prepared For:

THEMAC RESOURCES

Certified Professional Engineer Seal

This report documents work conducted under the oversight of the following Engineer:

Harry Lewsley, P.E.

Harry Lewsley
Signature

Exp. 12/31/2017
Date 12/5/2015

SITE DIVERSION ANALYSIS
COPPER FLAT PROJECT

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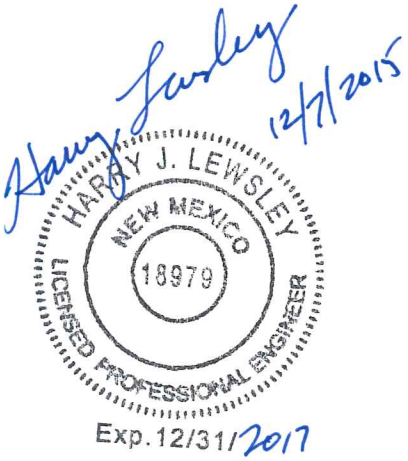

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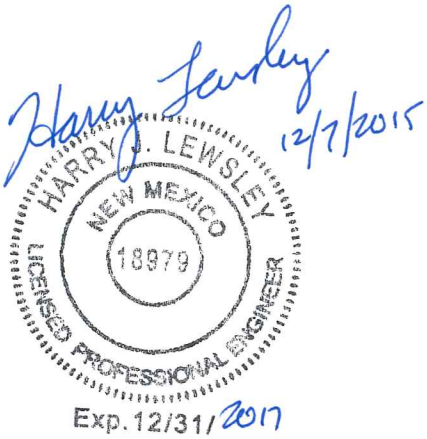

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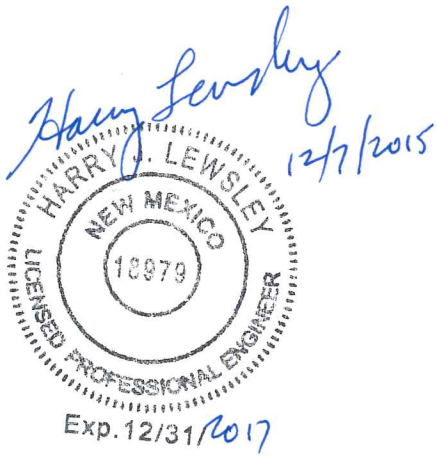

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D	HydroCAD Results for Post-Quintana Culvert Analysis
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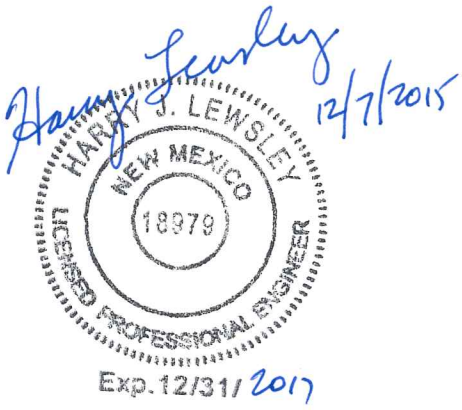

1 PURPOSE AND SCOPE OF ANALYSIS

The Copper Flat Project proposed for mine development by THEMAC Reources, Inc. through its subsidiary, New Mexico Copper Company (NMCC), lies within the Greenhorn Arroyo sub-basin in Sierra County, New Mexico (Dwg. 0000-CI-100).

Previous development of the mining property was conducted by Quintana Minerals Company (Quintana). The natural drainage pattern in the area (Dwg. 0000-CI-101) was modified by Quintana to divert surface drainages away from the proposed mine pit and protect the operations from flooding (Dwg. 0000-CI-102). In addition to the diversions, Quintana placed large diameter culverts beneath two crossings of Grayback Arroyo near the mine entrance. These structures are still in place and will be used by NMCC to limit stormwater run-on and prevent the site impacted areas from interacting with uncontained surface water flows for the planned mining operation (Dwg. 0000-CI-103).

The analysis completed was to evaluate existing diversions and water conveyance features at the Copper Flat Project with regard to their adequacy in conveying flows from storm events and protecting the site from flooding. In order to evaluate the adequacy of the existing diversions it was necessary to identify and evaluate surface water flow prior to the existence of the diversions (Dwg. 000-CI-104). Analytical methods were used to calculate the peak discharges, runoff volumes, and to determine if the existing site diversions and Grayback Arroyo culverts had the adequate capacity to convey the peak discharges and runoff around and away from the proposed site. Peak flows were analyzed for each sub-basin contributing to surface water flows upstream of the project area using the the HydroCAD program which uses both Soil Conservation Service (SCS) TR-20 methods (SCS, 1982) and TR-55 methods (USDA, 1986). An SCS 24-hour Type II storm was selected for simulation due to the project's location. Upstream watersheds were delineated as depicted on Dwg. 0000-CI-104.

The result of this evaluation demonstrates that existing diversions and culverts are adequate to prevent run-on or flooding of the mine site.

2 TYPE OF ANALYSIS

2.1 HYDROLOGY

Peak discharge and volume analysis was performed for drainage areas contributing to the Grayback Arroyo located within the Copper Flat project area. The return periods used were:

- 100-year, 24-hour storm, (Q100)
- 200-year, 24-hour storm, (Q200)
- 500-year, 24-hour storm, (Q500)

2.2 HYDRAULICS

Culvert and channel capacity analysis was conducted for the Grayback Arroyo to determine water surface elevations during the design storm for the two existing culvert crossings.

3 KEY ASSUMPTIONS

- Minimum of 10 percent impervious area assumed for all watersheds.
- Minimum time of concentration set to 5 minutes for developed watersheds and 10 minutes for natural watersheds.
- Soil Class D assumed because fine to medium sand and clay dominate beneath the top layer of soil, which will likely be excavated, in accordance with THEMAC Conceptual Model of Groundwater Flow.
- Surface description used for natural watersheds is “Desert Shrub Range” with a curve number (CN) of 86.
- Existing culverts were modeled assuming that they are in good condition and free of any debris.

4 PROCEDURES AND METHODS USED:

- Peak Discharges:
    - Calculated by the SCS methods using HydroCAD.
    - Calculated the existing discharges for the 100-, 200-, and 500-year, 24-hour storm events.
    - The peak discharges were found using an antecedent moisture condition (AMC) of II to represent normal conditions.
    - Time of concentration was calculated using the SCS Lag time method.
    - The length of longest watercourse, Lc, and mean watershed slope, Sc, were determined by using a combination of site surveys and USGS topographic maps.
- Culvert Capacity Calculations:
    - Calculated the existing culvert capacity for the 100-, 200-, and 500-year, 24-hour storm events.
    - Culvert capacity calculations completed using the Federal Highway Administration (FHWA) HY-8 program for Crossing #1. HY-8 was chosen for the first existing culvert crossing as the culverts will be subject to the peak discharge of the entire watershed reporting to them.
    - Culvert capacity calculations for Crossing #2 were computed utilizing HydroCAD due to the upstream ponding, which will mitigate the peak discharge and thus make the existing culvert at Crossing #2 act as a orifice outlet instead of a standard culvert.
    - Combined peak discharges at each crossing are less than the cumulative respective discharges due to the “routing” effect of Grayback Arroyo.

5 TECHNICAL DATA

- Precipitation depths are per the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Estimates (NOAA, 2006) near Hillsboro,NM.
- The watershed characteristic summary for the existing watersheds can be found in Appendix A.
- The files for the HydroCAD analysis for Pre-Quintana & Post-Quintana watersheds can be found in Appendices B and C, respectively.
- The HydroCAD analysis for the culvert crossings can be found in Appendix D.
- The HY-8 culvert analysis can be found in Appendix E.

6 RESULTS

Analysis of the pre-mine development topography and drainage pattern identified sixteen watersheds (Dwg. 0000-CI-105) contributing to Grayback Arroyo in the project area. These watersheds were analyzed using HydroCAD and the results are shown in Table 1 in cubic feet per second (cfs) for each watershed. The upstream drainages merged in the central portion of the current Copper Flat Project area and passed through to the eastern boundary via Grayback Arroyo.

Table 1: Pre-Quintana Watershed Characteristics

Watershed ID	Area (ac)	Lc (ft)	Avg. Sc (ft/ft)	Tc (min)	Q100 (cfs)	Q200 (cfs)	Q500 (cfs)
1	352.00	7,396	0.164	30.70	708.72	813.94	952.23
2	117.79	3,175	0.231	13.10	377.27	432.11	504.05
3	100.96	4,242	0.194	18.10	277.70	318.42	371.87
4	85.03	3,389	0.304	12.10	280.90	321.62	375.03
5	107.36	4,088	0.346	13.10	343.86	393.85	459.42
6	377.55	9,338	0.267	29.00	788.24	906.94	1060.97
7	144.47	5,064	0.277	17.40	405.48	464.86	542.79
8	92.01	3,617	0.273	13.40	291.83	334.29	389.99
9	235.91	7,005	0.267	23.00	567.91	651.70	761.76
10	333.62	10,278	0.262	31.50	660.28	758.38	887.32
11	397.83	7,149	0.182	28.30	843.39	968.42	1132.73
12	236.95	6,590	0.292	21.00	600.47	688.82	804.86
13	282.46	7,744	0.258	25.30	641.72	736.61	861.28
14	161.96	5,608	0.160	24.90	371.20	426.07	498.15
15	55.11	2,582	0.184	12.50	179.83	205.93	240.16
16	83.15	3,076	0.078	22.10	204.89	235.08	274.73

Lc = Length of longest waterpath
Sc = Slope
Tc = Time of concentration
Q = Flowrate

Diversion of surface drainages away from the prospective mining area was accomplished by Quintana using a number of diversions shown in Dwg. 0000-CI-105. Diversion 1 is an earthen diversion that re-routed a portion of Watershed 14 (Dwg. 0000 CI 105) to the east into an existing drainage that wraps around the north side of Animas Peak. Diversion 2 consists of earthen diversions routing Watersheds 12 and 13 southward to Diversion 3. Diversion 3 is a composite earthen diversion and bedrock cut that re-routes Watershed 10, 12, and 13 south into Watershed 6, where it joins the ancestral Grayback Arroyo channel south of the mine area (Dwg. 0000-CI-105). Diversion of surface drainages away from the mine area allows for surface water in the mine area to be managed in a manner that prevents impacted stormwater from migrating offsite or impacting groundwater.

Table 2 lists the watersheds that exist after the Quintana diversions, as altered by the NMCC development plan. The Quintana diversions and NMCC development plan alters the drainage pattern in the project area to facilitate control of impacted stormwater. As a result, Watersheds 15 and 16 (Dwg. 0000-CI-104) are completely within the project stormwater control area and are eliminated as tributaries to Grayback Arroyo and portions of Watersheds 1, 2, 3, and 14 are included in the project stormwater control area and isolated from interaction with Grayback Arroyo.

Table 2: Final Watershed Characteristics

Watershed ID	Area (ac)	Lc (ft)	Avg. Sc (ft/ft)	Tc (min)	Q100 (cfs)	Q200 (cfs)	Q500 (cfs)
1	28.21	N/A	0.249	5.00	117.20	133.97	155.94
2	106.56	3,068	0.314	11.00	363.66	415.35	484.31
3	34.99	1,603	0.177	8.70	129.54	148.20	172.66
4	75.02	3,047	0.339	10.50	259.92	297.56	346.92
5	124.19	5,976	0.340	18.00	342.49	392.70	458.61
6	331.22	8,173	0.310	24.20	774.13	888.50	1038.74
7	144.47	5,064	0.296	16.90	411.06	471.20	550.14
8	92.01	3,617	0.274	13.40	291.83	334.29	389.99
9	235.91	7,005	0.268	23.00	567.91	651.70	761.76
10	330.41	10,278	0.276	30.80	663.73	762.30	891.85
11	397.83	7,149	0.182	28.30	843.39	968.42	1132.73
12	227.42	6,590	0.315	20.20	588.30	674.80	789.72
13	275.51	7,744	0.293	23.80	649.87	745.85	871.93
14	79.97	3,545	0.224	14.60	243.90	279.49	326.19

Lc = Length of longest waterpath
Sc = Slope
Tc = Time of concentration
Q = Flowrate

In addition to the Diversions described above, Quintana installed culverts to convey water beneath two earthen crossings over the Grayback Arroyo channel southeast of the process plant area (Dwg. 0000-CI-103). The characteristics of these culverts were evaluated with respect to the calculated flows from the diverted and natural drainages upstream from the proposed mine area. Those characteristics and flows are presented in Tables 3 and 4. The modeled flows through the composite Grayback Arroyo drainage upstream of the culverts were evaluated to ensure that the culverts were adequate to transmit the necessary flows without risk of damage to the structures and flooding of the proposed mine site.

Table 3: Existing Culvert Characteristics and Flows

Crossing No.	Culvert CP Location	Description	End Treatment	Q100 (cfs)	Q200 (cfs)	Q500 (cfs)
1	2	3 – 177" CMPs	Projecting	3,552.39	4,191.95	5,046.09
2	1	1 – 177" CMP	Projecting	3,066.00	3,418.33	3,856.73

Table 4: Existing Culvert Elevations, Lengths, and Slopes

Crossing No.	Inlet Elev. (ft)	Outlet Elev. (ft)	Length (ft)	Slope (ft/ft)	Q100 Headwater Elev. (ft)	Q200 Headwater Elev. (ft)	Q500 Headwater Elev. (ft)	Top of Roadway Elev. (ft)
1	5372.0	5370.0	194.40	0.0103	5391.64	5397.05	5406.01	5419.0
2	5352.0	5344.0	255.4	0.0313	5386.54	5391.04	5396.71	5403.0

7 CONCLUSIONS

The 24-hour storm flows for 100-year, 200-year, and 500-year return periods were evaluated for the watersheds as they exist at present. Analysis of the results of the hydrologic analyses presented in this report demonstrates that the extisting diversions and control structures are adequate to protect the site from flooding during the modeled flow events.

The analyses conducted also determined that both culvert crossings are capable of conveying the Q500 without overtopping the adjacent roadway or pipeline corridor. This conclusion is based on the assumption that the culverts analyzed are in good working condition. Field inspection of the culverts completed by M3 found the body of the existing culverts to be in good condition; repair will be required at the upstream inlets and vegetation removal undertaken at culvert inlets and outlets in order to meet the conditions of this analysis.

8 REFERENCES

Bonin, GM, Martin, D., Lin, B., Parzybok, T., Yekta, M., and Riley, D., 2000. Precipitation Frequency Atlas of the United States, NOAA Atlas 14 Addendum, Volume 1, Version 4.0: Semiarid Southwest (Arizona, Southeast California, Nevada, New Mexico, Utah) Addendum – Update to Version 3.0. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, Maryland, 2004 revised 2006.

USDA, 1986. Urban Hydrology for Small Watersheds. U.S. Department of Agriculture, National Resources Conservation Service, Conservation Engineering Division. Technical Release (TR) 55. June, SCS, 1986.

SCS, 1982. [Draft] Computer Program Co. Project Formulation – Hydrology. Soil Conservation Service Technical Release 20. Washington, DC.

DRAWINGS

E 85.5000

E 89.5000

N 1,199,5000

N 1,195,5000

MINE PERMIT AREA BOUNDARY

DRAINAGE BASIN LIMITS

GRAYBACK ARROYO

NM - 152

HUNKIDORI ARROYO

GREENHORN ARROYO

GREENHORN ARROYO
DRAINAGE BASIN

GRAYBACK ARROYO

GREENHORN ARROYO

SECO CREEK

LAS ANIMAS CREEK

INTERSTATE 25

INTERSTATE 25

CABALLO
RESERVOIR

DRAINAGE BASIN LIMITS

NM - 27

PERCHA CREEK

LEGEND

- DRAINAGE BASIN BOUNDARY
- MINE PROPERTY BOUNDARY
- GRAYBACK ARROYO
- FLOWLINE

SITE PLAN

SCALE: 1" = 2500'

2500 1250 0 2500 5000

SCALE IN FEET
CONTOUR INTERVAL = 50'
DO NOT SCALE 11x17 DRAWINGS

PRELIMINARY
FOR AGENCY REVIEW

THEMAC RESOURCES

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PROJECT MGR		
CLIENT APPR.		

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COPPER FLAT PROJECT

GENERAL SITE CIVIL GREENHORN ARROYO PRE-MINING WATERSHED BASIN

JOB NO. M3 PN-120085

DWG NO. 0000-CI-100

REV NO. P2

DATE 20 NOV 15

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E 659,000

E 674,000

N 11,984,000

N 11,969,000

WATERSHED BOUNDARY

MINE PERMIT AREA BOUNDARY

GRAYBACK ARROYO

GRAYBACK ARROYO

GRAYBACK ARROYO

NM - 52

WATERSHED BOUNDARY

GREENHORN ARROYO

LEGEND

- DRAINAGE BASIN BOUNDARY
- MINE PROPERTY BOUNDARY
- GRAYBACK ARROYO
- FLOWLINE

SITE PLAN

SCALE: 1" = 1000'

1000 500 0 1000 2000

SCALE IN FEET
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DO NOT SCALE 11x17 DRAWINGS

PRELIMINARY
FOR AGENCY REVIEW

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COPPER FLAT PROJECT

GENERAL SITE
COPPER FLAT SITE
EXISTING HYDROLOGY
PRE-QUINTANA MINING

JOB NO. M3 PN-120085

DWG NO. **0000-CI-101**

REV NO. P1

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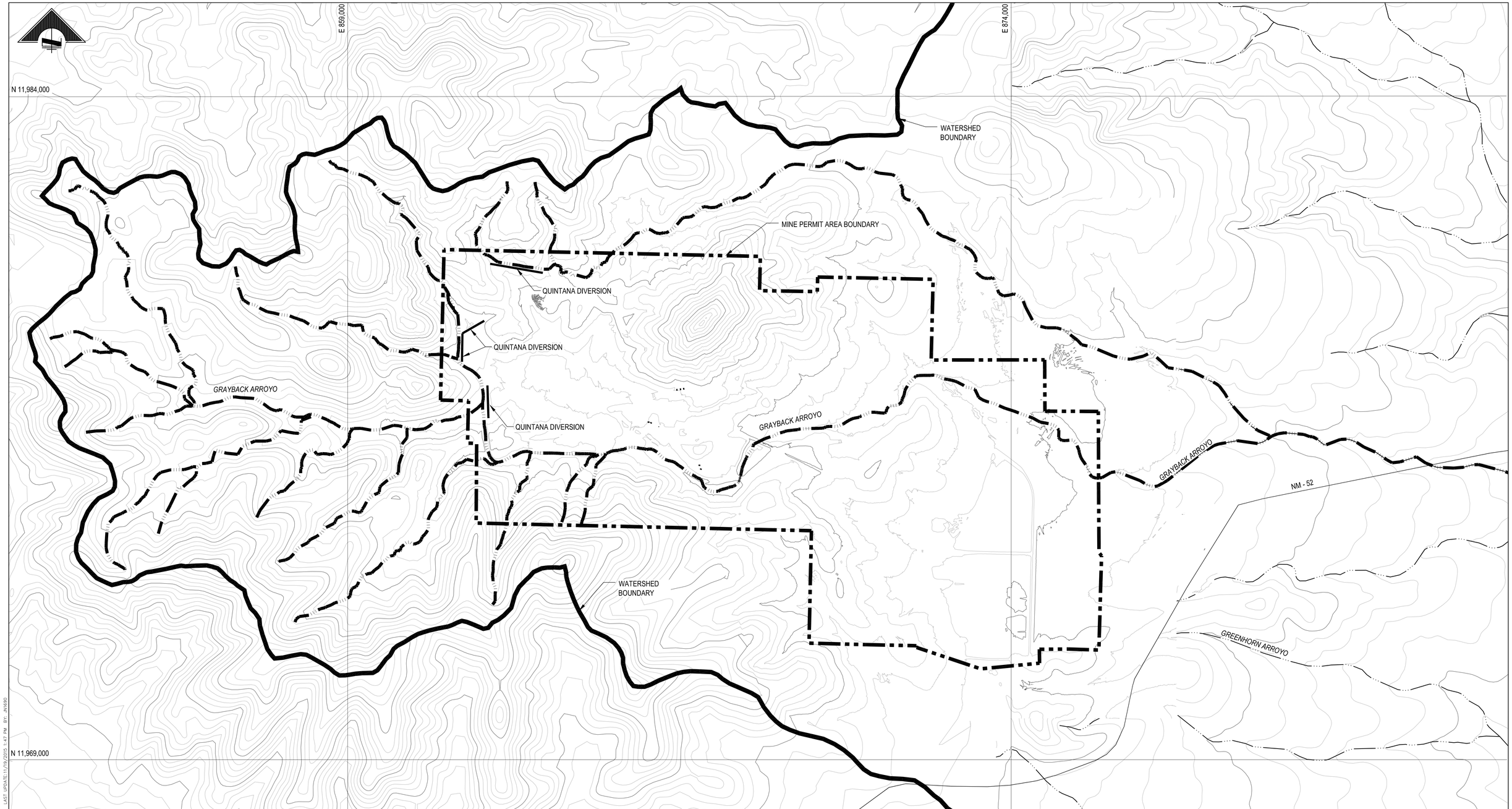

LEGEND

- DRAINAGE BASIN BOUNDARY
- MINE PROPERTY BOUNDARY
- GRAYBACK ARROYO
- FLOWLINE

SITE PLAN

SCALE: 1" = 1000'

1000 500 0 1000 2000

SCALE IN FEET
CONTOUR INTERVAL = 20 FT
DO NOT SCALE 11x17 DRAWINGS

PRELIMINARY
FOR AGENCY REVIEW

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COPPER FLAT PROJECT

GENERAL SITE
COPPER FLAT SITE
EXISTING HYDROLOGY
POST QUINTANA MINING

JOB NO. M3 PN-120085
DWG NO. 0000-CI-102
REV NO. P1
DATE 20 NOV 15

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E. 865,000

E. 870,000

E. 875,000

N. 11,979,000

N. 11,974,000

MINE PERMIT AREA BOUNDARY

QUINTANA DIVERSION

EWRSP-2B

EWRSP-2A

WRSP-1

WRSP-2

WRSP-3

STORMWATER CONVEYANCE CHANNEL

GROWTH MEDIA STOCKPILE

PERMIT BOUNDARY BARBED WIRE FENCE

QUINTANA DIVERSION

EWRSP-1

IMPACTED STORMWATER IMPOUNDMENT B

IMPACTED STORMWATER IMPOUNDMENT C

MINE PIT

EWRSP-3

GRAYBACK ARROYO

GROWTH MEDIA STOCKPILE

RECLAIM RESERVOIR

IMPACTED STORMWATER IMPOUNDMENT A

QUINTANA DIVERSION

EWRSP-4

PROCESS PLANT

CULVERT

MINE SITE ACCESS ROAD

QUINTANA DIVERSION CHANNEL

DIVERSION CHANNEL

TAILINGS TRENCH

SURGE POND

TAILINGS STORAGE FACILITY LIMIT

GRAYBACK ARROYO

EXPLOSIVES MAGAZINE ACCESS ROAD

CULVERTS

EXPLOSIVES MAGAZINE

DIRT ROAD TYP.

TAILINGS IMPOUNDMENT

TO HWY 152

UNDERDRAIN COLLECTION POND

GROWTH MEDIA STOCKPILE

5700 5600 5400 5300 5200 6000 5900 5800 6100 5500

LEGEND

- MINE PROPERTY BOUNDARY
- GRAYBACK ARROYO
- QUINTANA DIVERSION

EWRSP = EXISTING WASTE ROCK STOCKPILE
WRSP = WASTE ROCK STOCKPILE

SITE PLAN

SCALE: 1:500

500' 250' 0' 500' 1000'

1" = 500'

DO NOT SCALE 11x17 DRAWINGS

PRELIMINARY
FOR AGENCY REVIEW

THEMAC RESOURCES

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COPPER FLAT PROJECT

SITE GENERAL CIVIL GRAYBACK ARROYO DIVERSION THROUGH NMCC PROJECT SITE

JOB NO. M3 PN-120085

DWG NO. **0000-CI-103**

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DATE 20 NOV 15

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E. 855,000
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E. 870,000
N. 11,980,000
N. 11,975,000
MINE PERMIT AREA BOUNDARY
ANIMAS PEAK
GRAYBACK ARROYO
GRAYBACK ARROYO
WS 1
WS 2
WS 3
WS 4
WS 5
WS 6
WS 7
WS 8
WS 9
WS 10
WS 11
WS 12
WS 13
WS 14
WS 15
WS 16

WATERSHED SUMMARY

WATERSHED ID	AREA (AC)	Q100 (CFS)
1	352.00	708.72
2	117.79	377.27
3	100.96	277.70
4	85.03	280.90
5	107.36	343.86
6	377.55	788.24
7	144.47	405.48
8	92.01	291.83
9	235.91	567.91
10	333.62	660.28
11	397.83	843.39
12	236.95	600.47
13	282.46	641.72
14	161.96	371.20
15	55.11	179.83
16	83.15	204.89

LEGEND:

- FLOW ARROW
- WATERSHED BOUNDARY
- RUNOFF CONCENTRATION POINT
- WATERCOURSE PATH
- MINE PERMIT BOUNDARY

PLAN VIEW

SCALE: 1" = 600'

600 300 0 600 1200

SCALE IN FEET
CONTOUR INTERVAL = 25FT
DO NOT SCALE 11x17 DRAWINGS

PRELIMINARY
FOR AGENCY REVIEW

THEMAC RESOURCES

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COPPER FLAT PROJECT

GENERAL SITE CIVIL PRE QUINTANA EXISTING WATERSHED AREAS

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WS 2
WS 3
WS 4
WS 5
WS 6
WS 7
WS 8
WS 9
WS 10
WS 11
WS 12
WS 13
WS 14
MINE PERMIT AREA BOUNDARY
DEVELOPED WATERSHED BOUNDARY
QUINTANA DIVERSION 1
QUINTANA DIVERSION 2
QUINTANA DIVERSION 3
ULTIMATE PIT EXTENTS
MINE PIT
ANIMAS PEAK
EXISTING PLANT
EXISTING CULVERT CROSSING #1
EXISTING CULVERT CROSSING #2
GRAYBACK ARROYO
5900
5800
5700
5600
5500
6100
6000

WATERSHED SUMMARY

WATERSHED ID	AREA (AC)	Q100 (CFS)
1	28.21	117.20
2	106.56	363.66
3	34.99	129.54
4	75.02	259.92
5	124.19	342.49
6	331.22	774.13
7	144.47	411.06
8	92.01	291.83
9	235.91	567.91
10	330.41	663.73
11	397.83	843.39
12	227.42	588.30
13	275.51	649.87
14	79.97	243.90

LEGEND:

- FLOW ARROW
- WATERSHED BOUNDARY
- RUNOFF CONCENTRATION POINT
- WATERCOURSE PATH
- MINE PROPERTY BOUNDARY

PLAN VIEW

SCALE: 1" = 600'

600 300 0 600 1200

SCALE IN FEET
CONTOUR INTERVAL = 25FT
DO NOT SCALE 11x17 DRAWINGS

PRELIMINARY
FOR AGENCY REVIEW

THEMAC RESOURCES

REFERENCES		REFERENCES	
DWG. NO.	TITLE	DWG. NO.	TITLE

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE:	1" = 600'	DATE
DESIGNED BY	AJE	OCT 15
DRAWN BY	AJE	OCT 15
CHECKED BY		
PROJECT MGR		
CLIENT APPR.		

m3 ARCHITECTURE ENGINEERING CONSTRUCTION MANAGEMENT
www. m3eng.com

COPPER FLAT PROJECT

GENERAL SITE CIVIL POST QUINTANA EXISTING WATERSHED AREAS

JOB NO. M3 PN-120085
DWG NO. 0000-CI-105
REV NO. P2
DATE 09 JUN 16

File: P:\2013\120085\CIVIL (3441)\3442 Dwgs\Figures for Permit\0000CI105.dwg LAST UPDATE: 6/9/2016 7:25 AM BY: DK1634

APPENDIX A

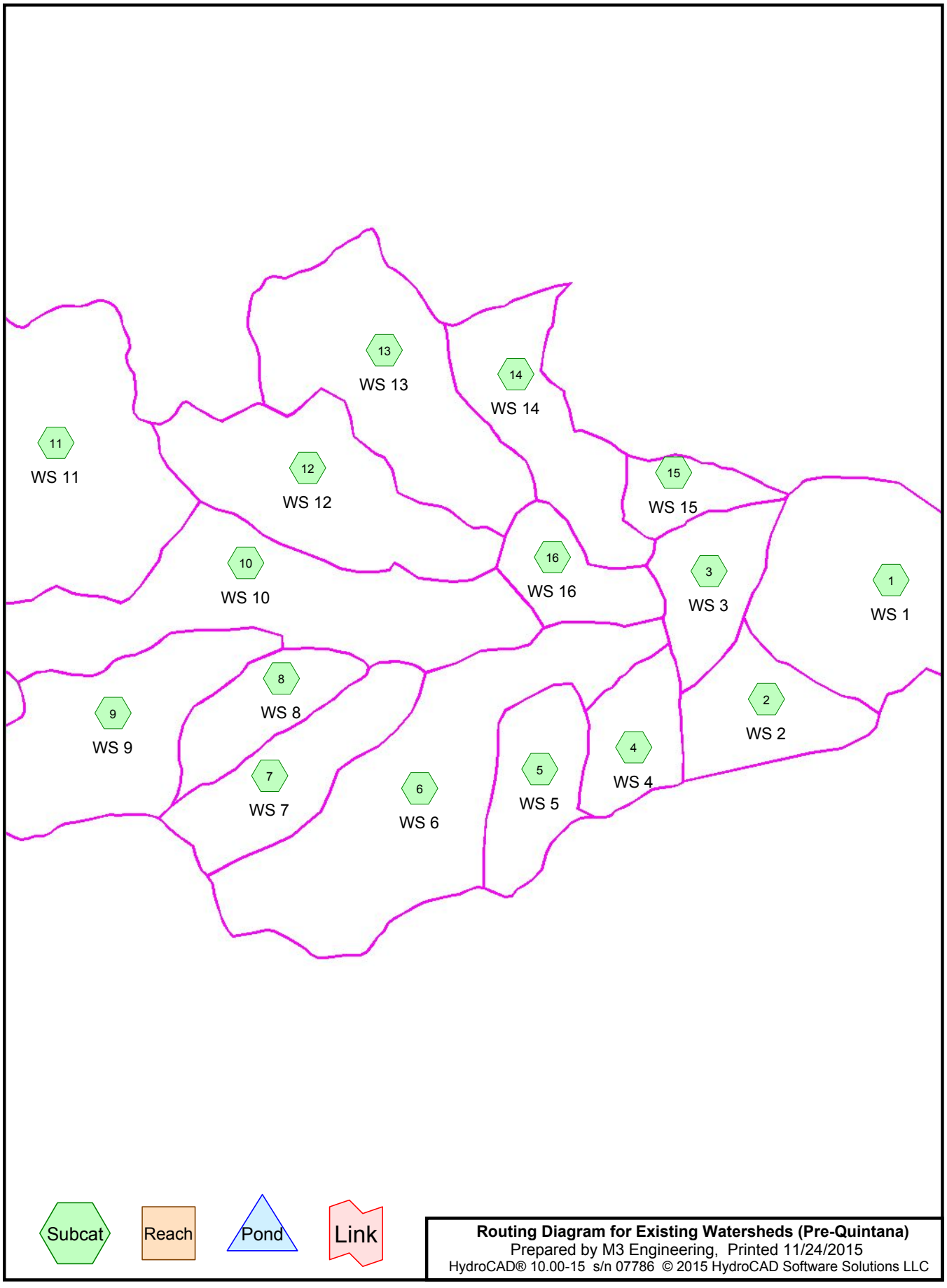
WATERSHED SUMMARY - EXISTING

Adam Edwards
11/24/2015

Pre-Quintana Existing												
Watershed ID	**Area**	**Total Area**	**Desert Shrub CN=86**	**Impervious Area CN=98**	**Pit Material CN=80**	**L_c**	**Avg. S_c**	**Q_{100} - SCS**	**Tc Method**	**Tc**	**Weighted SCS CN**	**Soil Type**
--	*sq. feet*	*acres*	*acres*	*acres*	*acres*	*ft*	*ft/ft*	*cfs*	--	*min*	--	--
1	15,333,000	352.00	316.80	35.20	0.00	7,396	0.164	708.72	SCS Lag	30.70	87	D
2	5,131,142	117.79	106.01	11.78	0.00	3,175	0.231	377.27	SCS Lag	13.10	87	D
3	4,397,931	100.96	90.87	10.10	0.00	4,242	0.194	277.70	SCS Lag	18.10	87	D
4	3,703,864	85.03	76.53	8.50	0.00	3,389	0.304	280.9	SCS Lag	12.10	87	D
5	4,676,541	107.36	96.62	10.74	0.00	4,088	0.346	343.86	SCS Lag	13.10	87	D
6	16,446,115	377.55	339.79	37.75	0.00	9,338	0.267	788.24	SCS Lag	29.00	87	D
7	6,292,945	144.47	130.02	14.45	0.00	5,064	0.277	405.48	SCS Lag	17.40	87	D
8	4,008,126	92.01	82.81	9.20	0.00	3,617	0.273	291.83	SCS Lag	13.40	87	D
9	10,276,128	235.91	212.32	23.59	0.00	7,005	0.267	567.91	SCS Lag	23.00	87	D
10	14,532,660	333.62	300.26	33.36	0.00	10,278	0.262	660.28	SCS Lag	31.50	87	D
11	17,329,719	397.83	358.05	39.78	0.00	7,149	0.182	843.39	SCS Lag	28.30	87	D
12	10,321,490	236.95	213.25	23.69	0.00	6,590	0.292	600.47	SCS Lag	21.00	87	D
13	12,303,894	282.46	254.21	28.25	0.00	7,744	0.258	641.72	SCS Lag	25.30	87	D
14	7,054,905	161.96	145.76	16.20	0.00	5,608	0.160	371.2	SCS Lag	24.90	87	D
15	2,400,616	55.11	49.60	5.51	0.00	2,582	0.184	179.83	SCS Lag	12.50	87	D
16	3,621,863	83.15	74.83	8.31	0.00	3,076	0.078	204.89	SCS Lag	22.10	87	D

Post-Quintana Existing												
Watershed ID	**Area**	**Total Area**	**Desert Shrub CN=86**	**Impervious Area CN=98**	**Pit Material CN=80**	**L_c**	**Avg. S_c**	**Q_{100} - SCS**	**Tc Method**	**Tc**	**Weighted SCS CN**	**Soil Type**
--	*sq. feet*	*acres*	*acres*	*acres*	*acres*	*ft*	*ft/ft*	*cfs*	--	*min*	--	--
1 (pond)	1,228,747	28.21	25.39	2.82	0.00	0	0.249	**117.20**	Minimum	5.00	87	D
2	4,641,978	106.56	95.91	10.66	0.00	3,068	0.314	**363.66**	SCS Lag	11.00	87	D
3	1,523,968	34.99	31.49	3.50	0.00	1,603	0.177	**129.54**	SCS Lag	8.70	87	D
4	3,267,841	75.02	67.52	7.50	0.00	3,047	0.339	**259.92**	SCS Lag	10.50	87	D
5	5,409,568	124.19	111.77	12.42	0.00	5,976	0.340	**342.49**	SCS Lag	18.00	87	D
6	14,427,914	331.22	298.10	33.12	0.00	8,173	0.310	**774.13**	SCS Lag	24.20	87	D
7	6,292,945	144.47	130.02	14.45	0.00	5,064	0.296	**411.06**	SCS Lag	16.90	87	D
8	4,008,126	92.01	82.81	9.20	0.00	3,617	0.274	**291.83**	SCS Lag	13.40	87	D
9	10,276,128	235.91	212.32	23.59	0.00	7,005	0.268	**567.91**	SCS Lag	23.00	87	D
10	14,392,904	330.41	297.37	33.04	0.00	10,278	0.276	**663.73**	SCS Lag	30.80	87	D
11	17,329,719	397.83	358.05	39.78	0.00	7,149	0.182	**843.39**	SCS Lag	28.30	87	D
12	9,906,558	227.42	204.68	22.74	0.00	6,590	0.315	**588.30**	SCS Lag	20.20	87	D
13	12,001,134	275.51	247.96	27.55	0.00	7,744	0.293	**649.87**	SCS Lag	23.80	87	D
14	3,483,496	79.97	71.97	8.00	0.00	3,545	0.224	**243.90**	SCS Lag	14.60	87	D

APPENDIX B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WS 13
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WS 14
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WS 11
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WS 12
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WS 16
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WS 3
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WS 1
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WS 8
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WS 9
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WS 2
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WS 4
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WS 7
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WS 6
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WS 5
Subcat
Reach
Pond
Link
Routing Diagram for Existing Watersheds (Pre-Quintana)
Prepared by M3 Engineering, Printed 11/24/2015
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Existing Watersheds (Pre-Quintana)
Prepared by M3 Engineering Printed 11/24/2015

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2,847.730	86	Desert shrub range, Fair, HSG D (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16)
316.410	98	Impervious, HSG D (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16)
3,164.140	**87**	**TOTAL AREA**

Existing Watersheds (Pre-Quintana)
Prepared by M3 Engineering Printed 11/24/2015

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3,164.140	HSG D	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
0.000	Other	
3,164.140		**TOTAL AREA**

Existing Watersheds (Pre-Quintana)
Prepared by M3 Engineering Printed 11/24/2015

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	2,847.730	0.000	2,847.730	Desert shrub range, Fair	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
0.000	0.000	0.000	316.410	0.000	316.410	Impervious	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
0.000	**0.000**	**0.000**	**3,164.140**	**0.000**	**3,164.140**	**TOTAL AREA**	

Existing Watersheds (Pre-Quintana) *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=352.000 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,396' Slope=0.1640 '/' Tc=30.7 min CN=87 Runoff=708.72 cfs 69.315 af

Subcatchment2: WS 2 Runoff Area=117.790 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,175' Slope=0.2310 '/' Tc=13.1 min CN=87 Runoff=377.27 cfs 23.195 af

Subcatchment3: WS 3 Runoff Area=100.970 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=4,242' Slope=0.1940 '/' Tc=18.1 min CN=87 Runoff=277.70 cfs 19.883 af

Subcatchment4: WS 4 Runoff Area=85.030 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,389' Slope=0.3050 '/' Tc=12.1 min CN=87 Runoff=280.90 cfs 16.744 af

Subcatchment5: WS 5 Runoff Area=107.360 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=4,088' Slope=0.3460 '/' Tc=13.1 min CN=87 Runoff=343.86 cfs 21.141 af

Subcatchment6: WS 6 Runoff Area=377.540 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=9,338' Slope=0.2670 '/' Tc=29.0 min CN=87 Runoff=788.24 cfs 74.344 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=5,064' Slope=0.2780 '/' Tc=17.4 min CN=87 Runoff=405.48 cfs 28.449 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=291.83 cfs 18.118 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=567.91 cfs 46.455 af

Subcatchment10: WS 10 Runoff Area=333.620 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=10,278' Slope=0.2630 '/' Tc=31.5 min CN=87 Runoff=660.28 cfs 65.695 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=843.39 cfs 78.339 af

Subcatchment12: WS 12 Runoff Area=236.940 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=6,590' Slope=0.2920 '/' Tc=21.0 min CN=87 Runoff=600.47 cfs 46.657 af

Subcatchment13: WS 13 Runoff Area=282.460 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,744' Slope=0.2590 '/' Tc=25.3 min CN=87 Runoff=641.72 cfs 55.621 af

Subcatchment14: WS 14 Runoff Area=161.960 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=5,608' Slope=0.1600 '/' Tc=24.9 min CN=87 Runoff=371.20 cfs 31.893 af

Subcatchment15: WS 15 Runoff Area=55.110 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=2,582' Slope=0.1840 '/' Tc=12.5 min CN=87 Runoff=179.83 cfs 10.852 af

Subcatchment16: WS 16 Runoff Area=83.140 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,076' Slope=0.0780 '/' Tc=22.1 min CN=87 Runoff=204.89 cfs 16.372 af

Total Runoff Area = 3,164.140 ac Runoff Volume = 623.071 af Average Runoff Depth = 2.36"
90.00% Pervious = 2,847.730 ac 10.00% Impervious = 316.410 ac

Existing Watersheds (Pre-Quintana) *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 1: WS 1

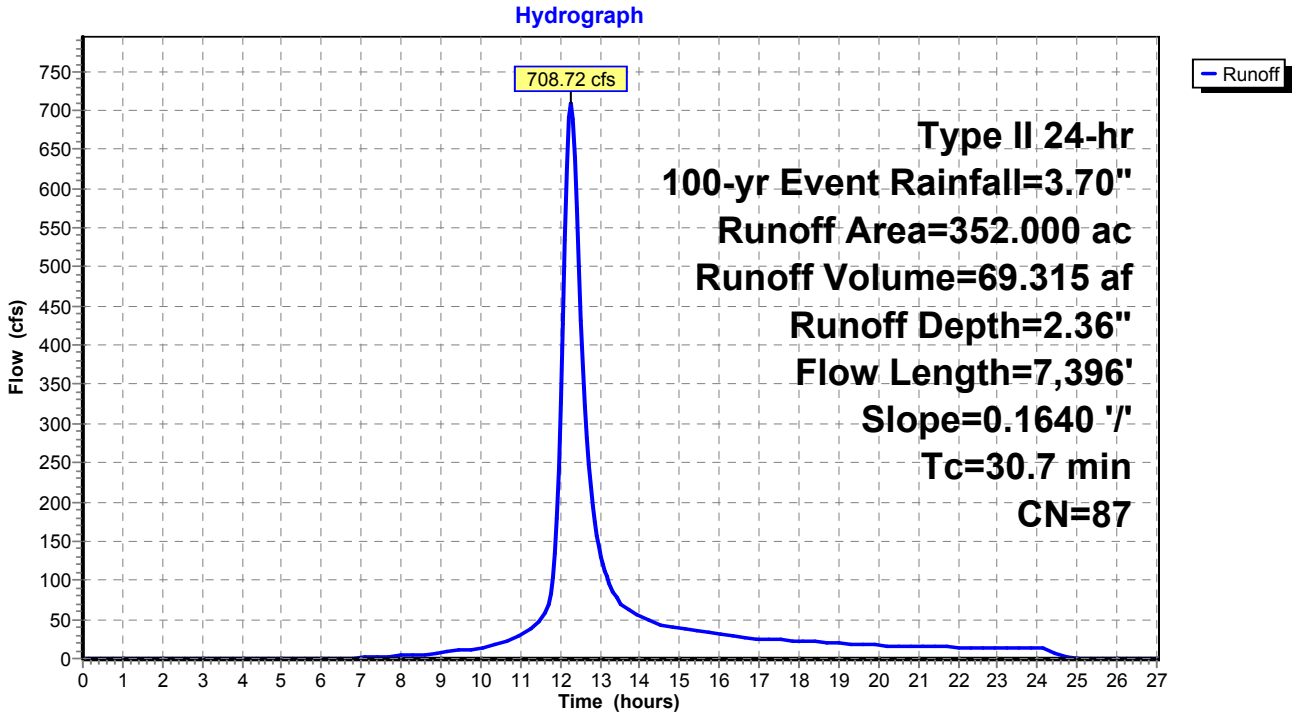
Runoff = 708.72 cfs @ 12.25 hrs, Volume= 69.315 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	316.800	86	Desert shrub range, Fair, HSG D
*	35.200	98	Impervious, HSG D
	352.000	87	Weighted Average
	316.800		90.00% Pervious Area
	35.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	7,396	0.1640	4.02		**Lag/CN Method,**

Subcatchment 1: WS 1



Summary for Subcatchment 2: WS 2

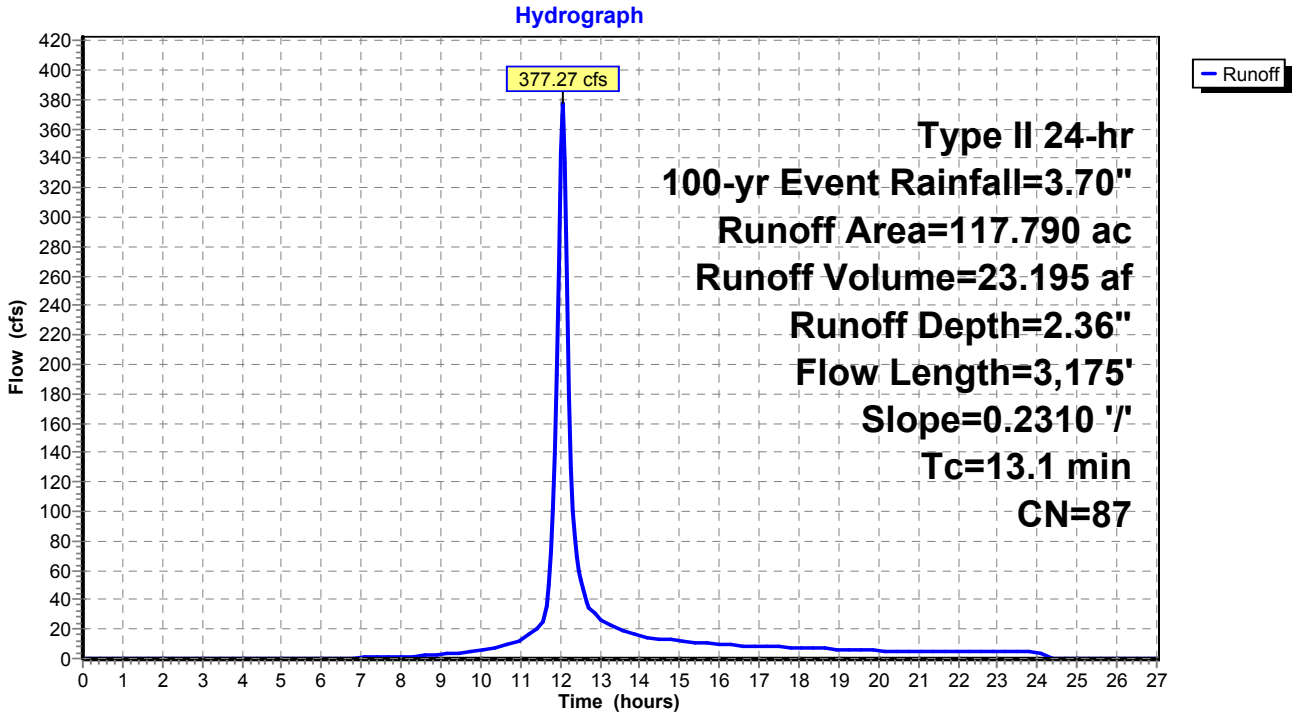
Runoff = 377.27 cfs @ 12.05 hrs, Volume= 23.195 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	106.010	86	Desert shrub range, Fair, HSG D
*	11.780	98	Impervious, HSG D
	117.790	87	Weighted Average
	106.010		90.00% Pervious Area
	11.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	3,175	0.2310	4.03		**Lag/CN Method,**

Subcatchment 2: WS 2



Summary for Subcatchment 3: WS 3

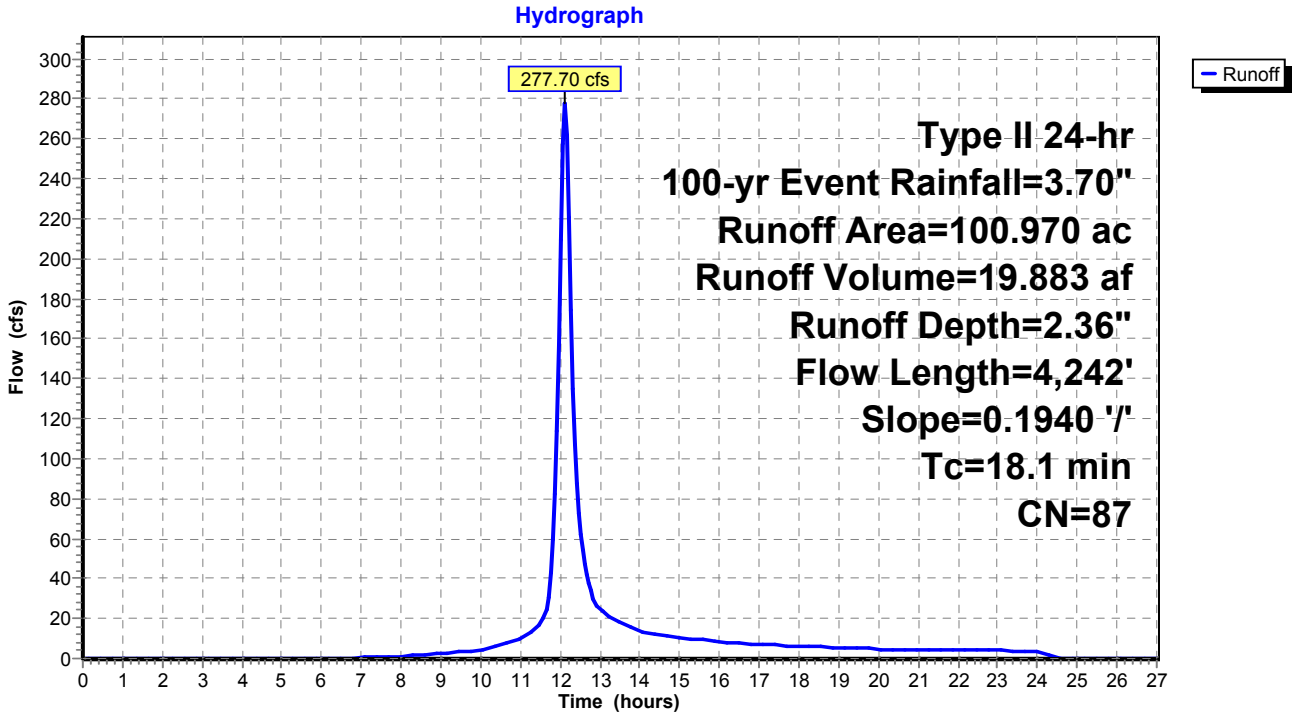
Runoff = 277.70 cfs @ 12.10 hrs, Volume= 19.883 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	90.870	86	Desert shrub range, Fair, HSG D
*	10.100	98	Impervious, HSG D
	100.970	87	Weighted Average
	90.870		90.00% Pervious Area
	10.100		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	4,242	0.1940	3.91		**Lag/CN Method,**

Subcatchment 3: WS 3



Existing Watersheds (Pre-Quintana) *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 4: WS 4

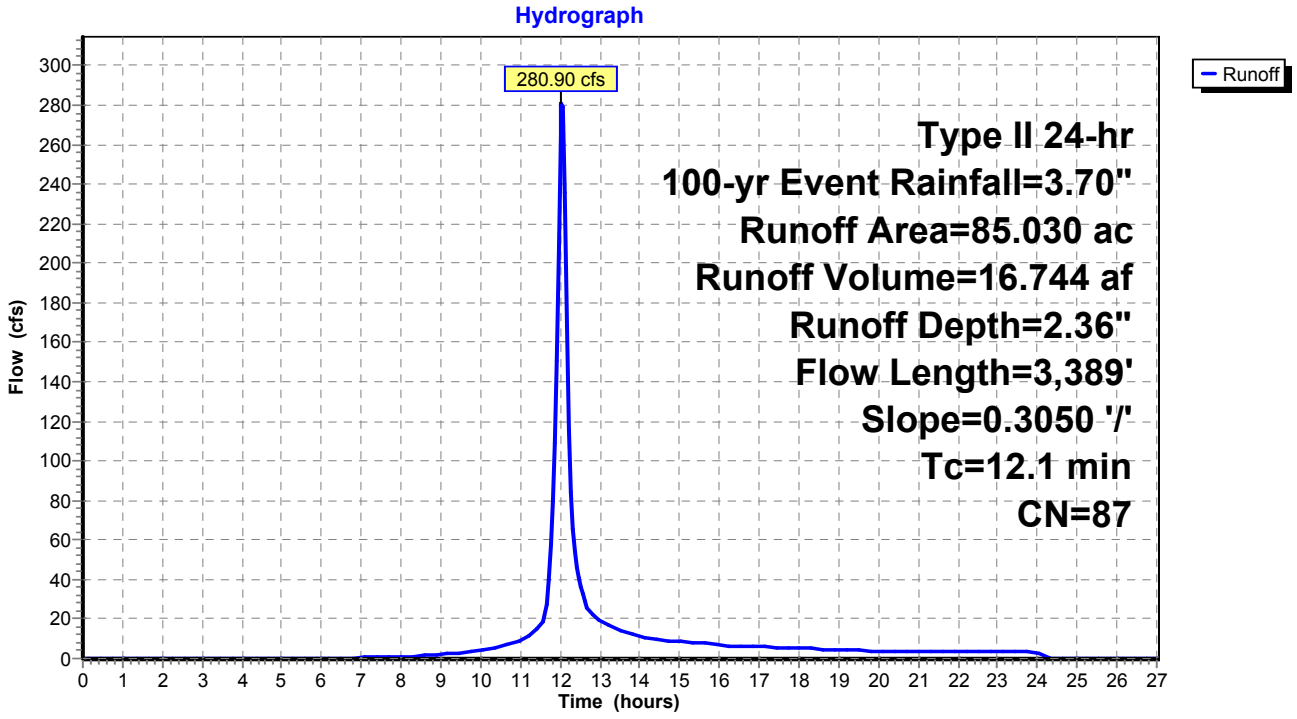
Runoff = 280.90 cfs @ 12.04 hrs, Volume= 16.744 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	76.530	86	Desert shrub range, Fair, HSG D
*	8.500	98	Impervious, HSG D
	85.030	87	Weighted Average
	76.530		90.00% Pervious Area
	8.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	3,389	0.3050	4.69		**Lag/CN Method,**

Subcatchment 4: WS 4



Summary for Subcatchment 5: WS 5

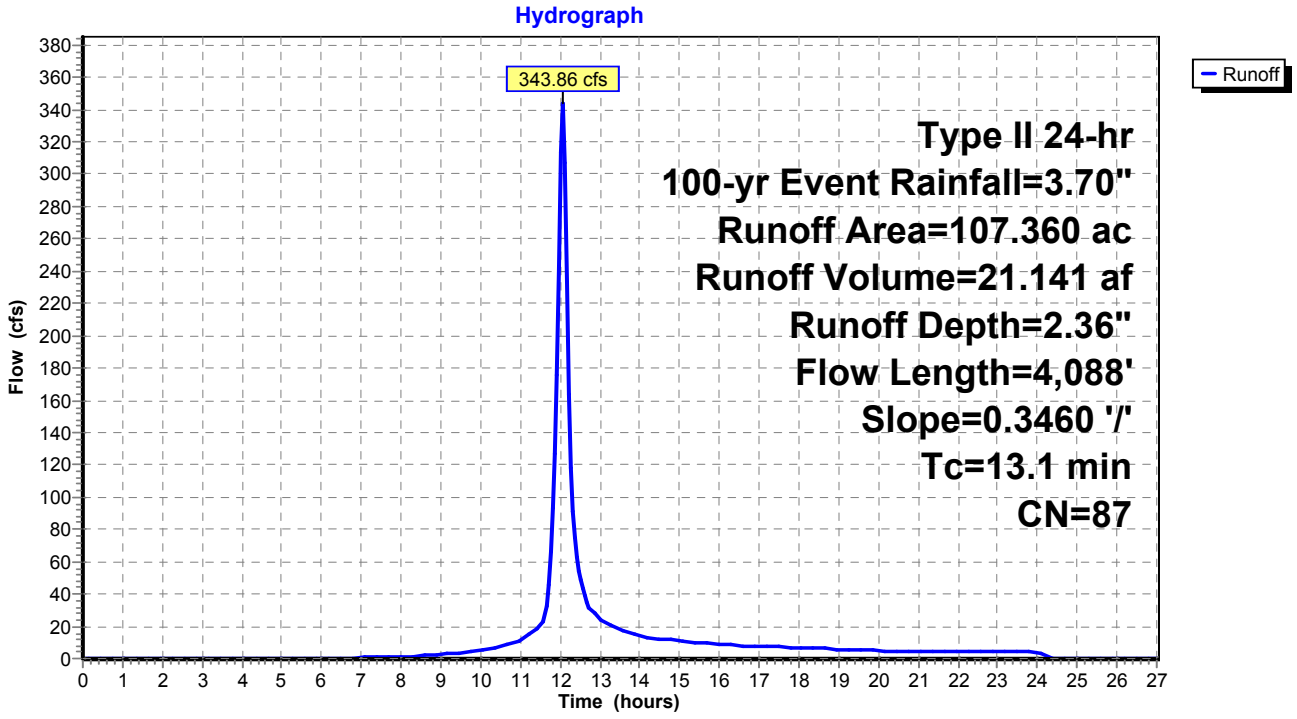
Runoff = 343.86 cfs @ 12.05 hrs, Volume= 21.141 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	96.620	86	Desert shrub range, Fair, HSG D
*	10.740	98	Impervious, HSG D
	107.360	87	Weighted Average
	96.620		90.00% Pervious Area
	10.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	4,088	0.3460	5.18		**Lag/CN Method,**

Subcatchment 5: WS 5



Summary for Subcatchment 6: WS 6

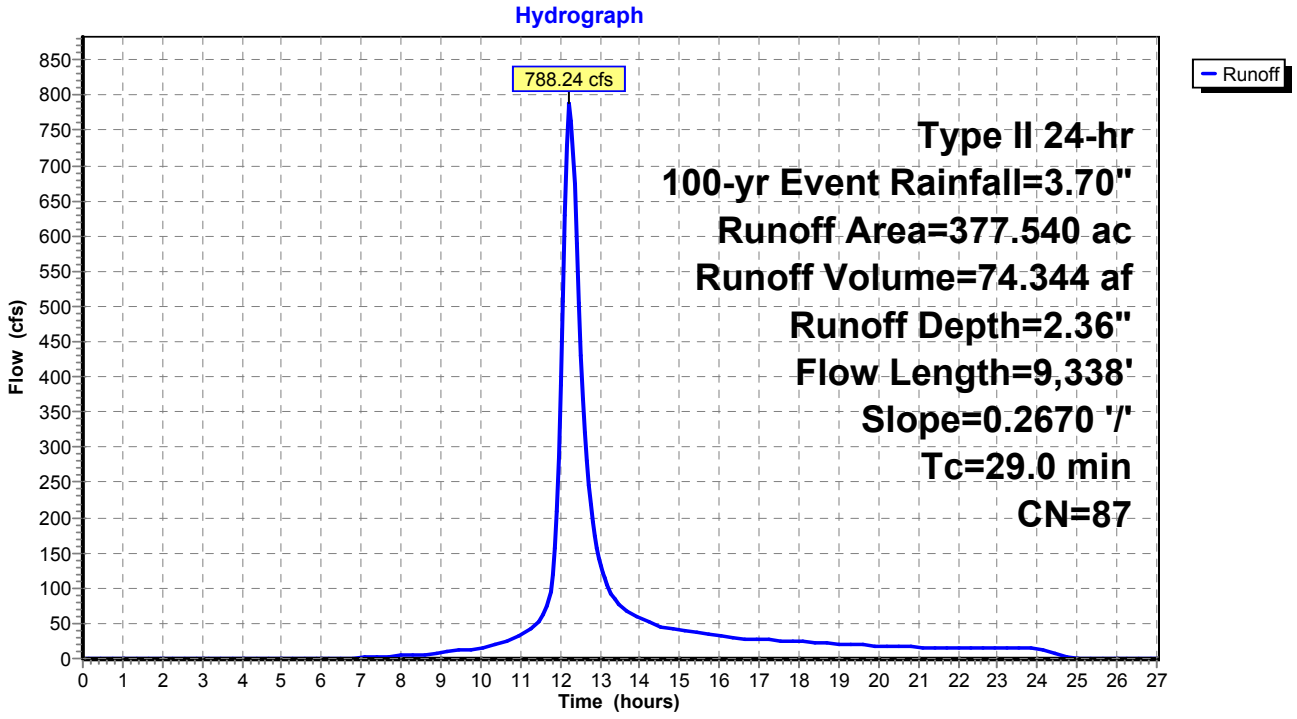
Runoff = 788.24 cfs @ 12.23 hrs, Volume= 74.344 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	339.790	86	Desert shrub range, Fair, HSG D
*	37.750	98	Impervious, HSG D
	377.540	87	Weighted Average
	339.790		90.00% Pervious Area
	37.750		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.0	9,338	0.2670	5.37		**Lag/CN Method,**

Subcatchment 6: WS 6



Summary for Subcatchment 7: WS 7

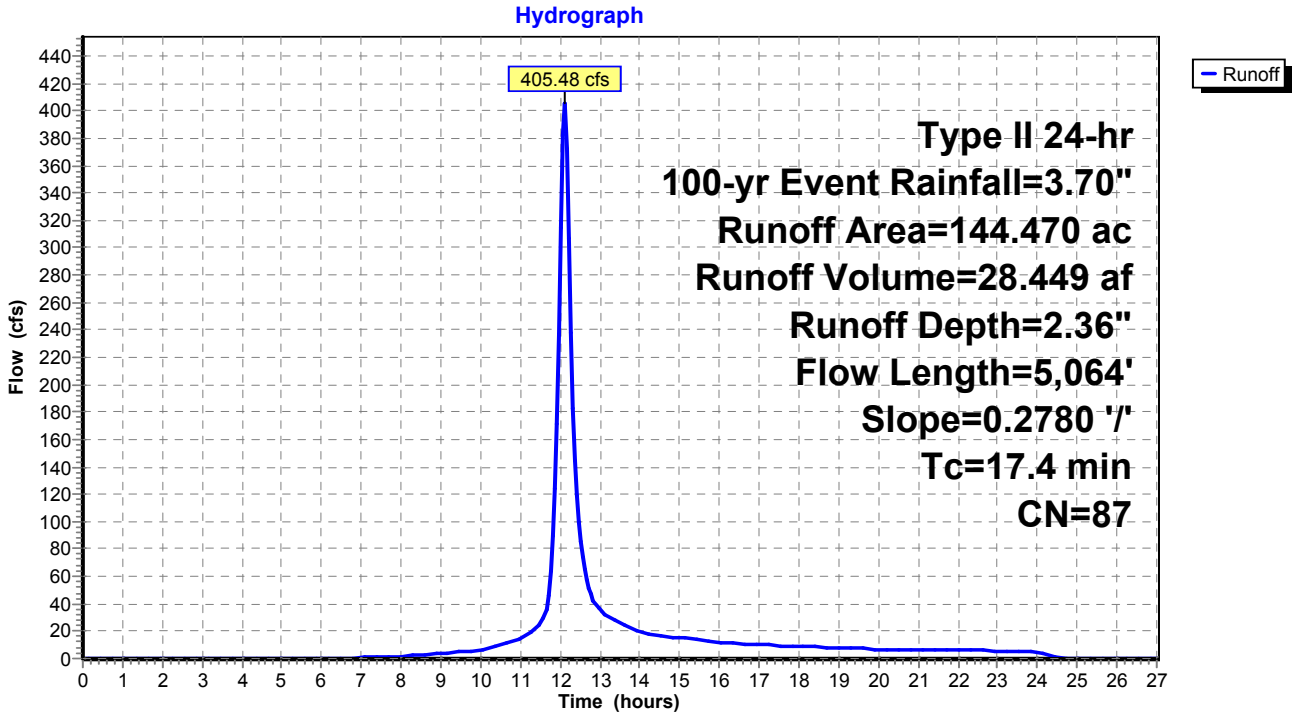
Runoff = 405.48 cfs @ 12.10 hrs, Volume= 28.449 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	5,064	0.2780	4.85		**Lag/CN Method,**

Subcatchment 7: WS 7



Summary for Subcatchment 8: WS 8

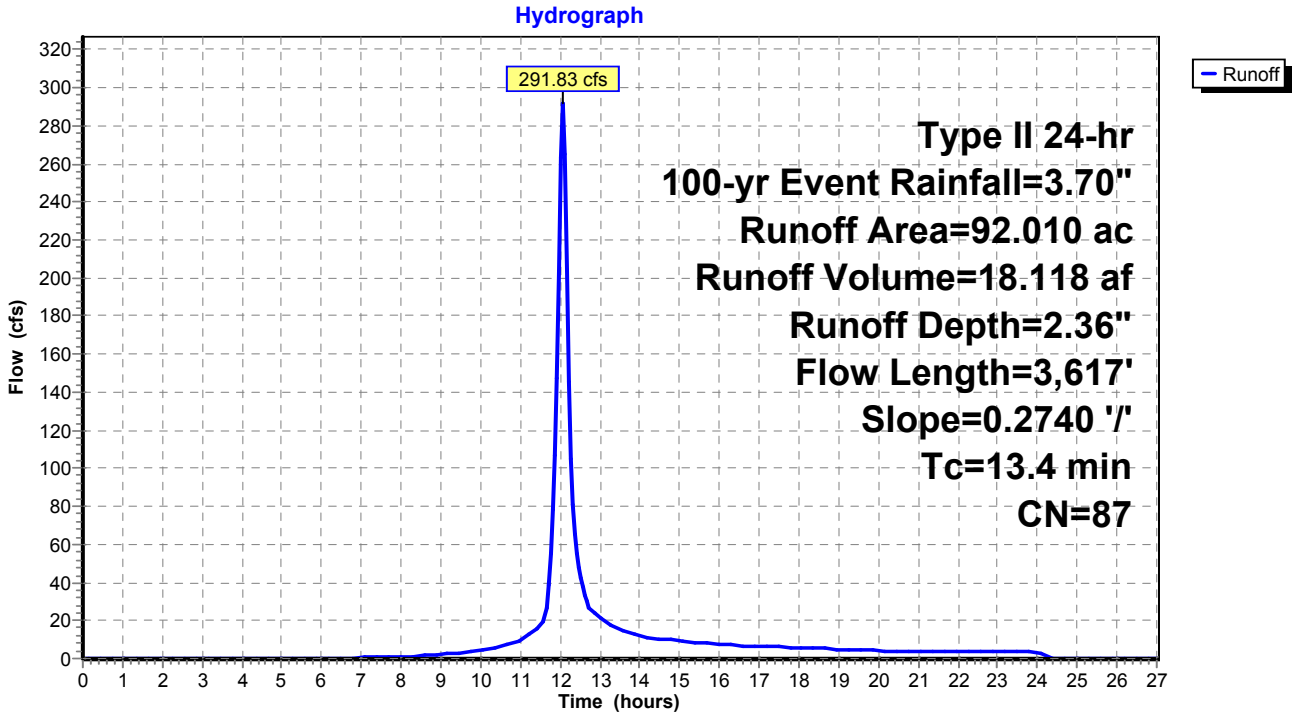
Runoff = 291.83 cfs @ 12.05 hrs, Volume= 18.118 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

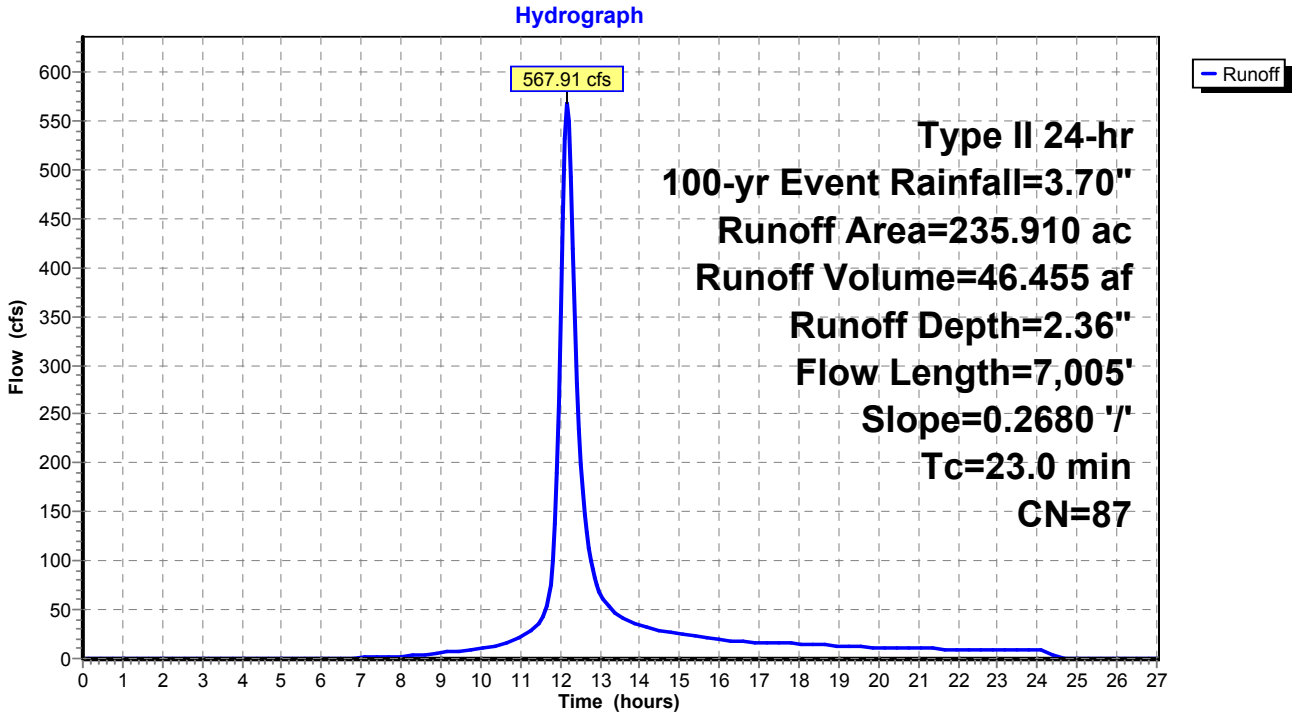
Runoff = 567.91 cfs @ 12.16 hrs, Volume= 46.455 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Summary for Subcatchment 10: WS 10

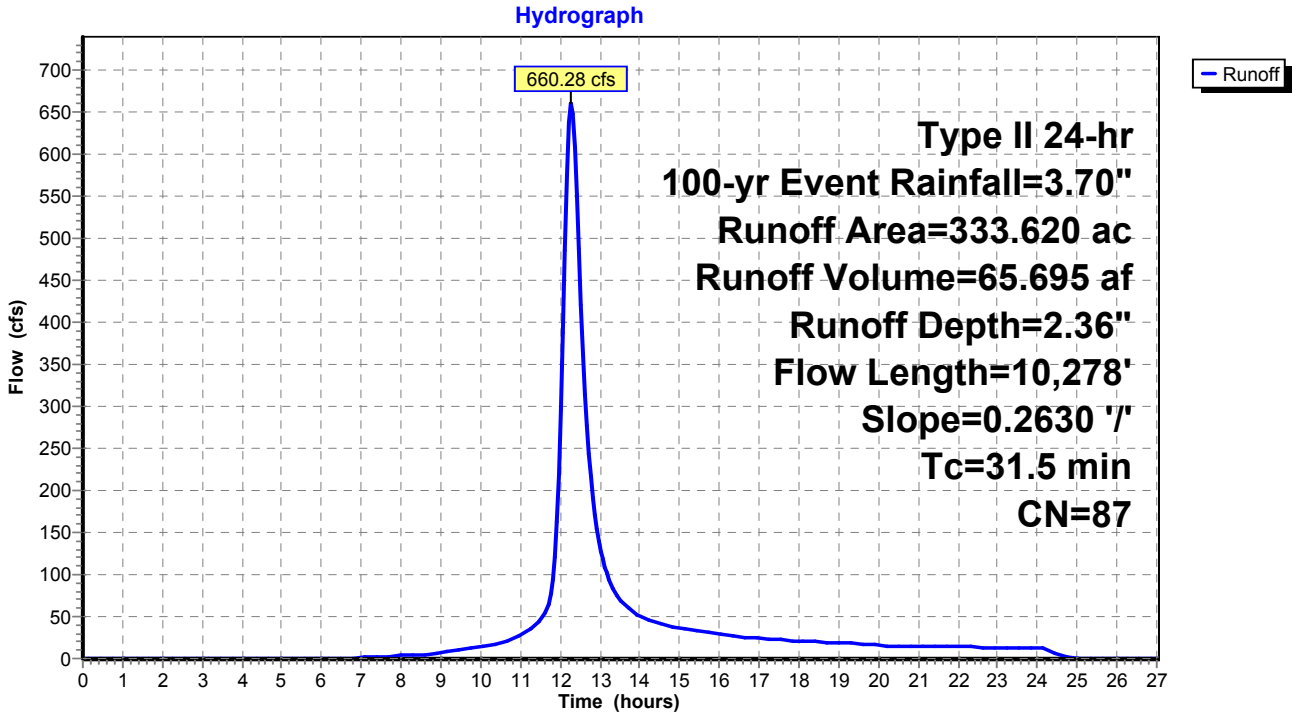
Runoff = 660.28 cfs @ 12.26 hrs, Volume= 65.695 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	300.260	86	Desert shrub range, Fair, HSG D
*	33.360	98	Impervious, HSG D
	333.620	87	Weighted Average
	300.260		90.00% Pervious Area
	33.360		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	10,278	0.2630	5.43		**Lag/CN Method,**

Subcatchment 10: WS 10



Summary for Subcatchment 11: WS 11

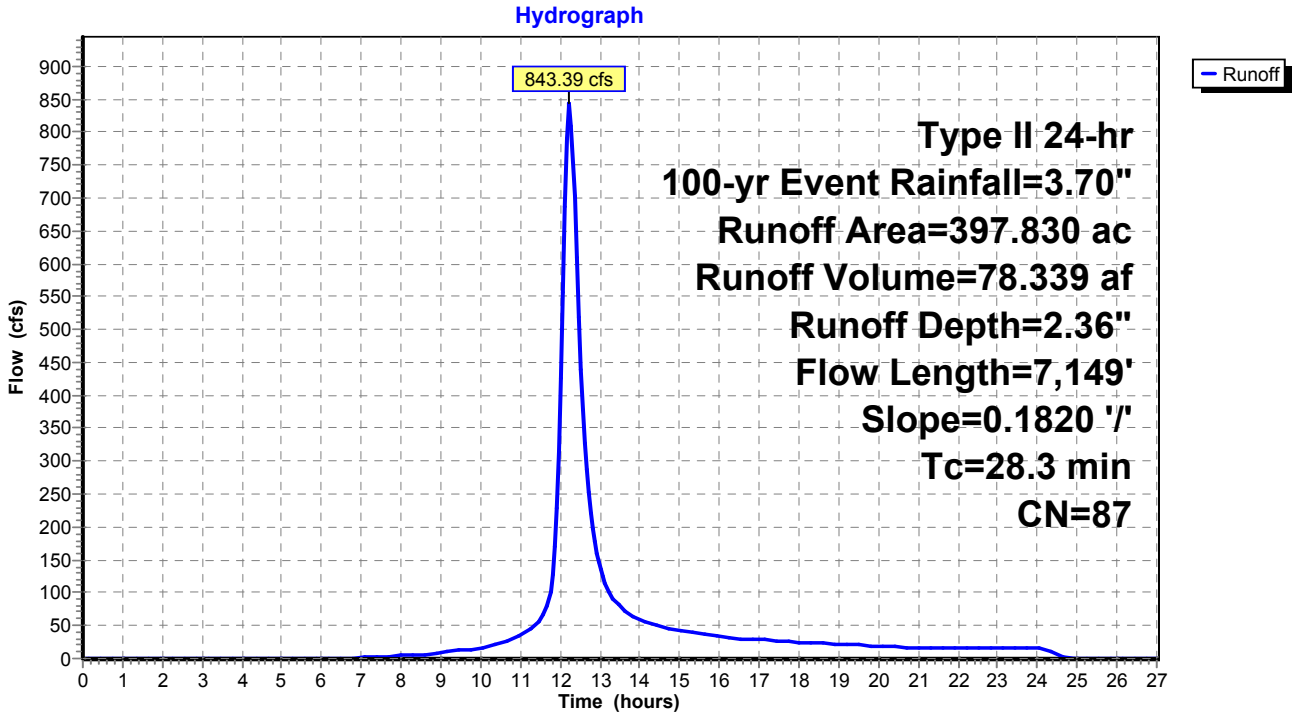
Runoff = 843.39 cfs @ 12.22 hrs, Volume= 78.339 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Summary for Subcatchment 12: WS 12

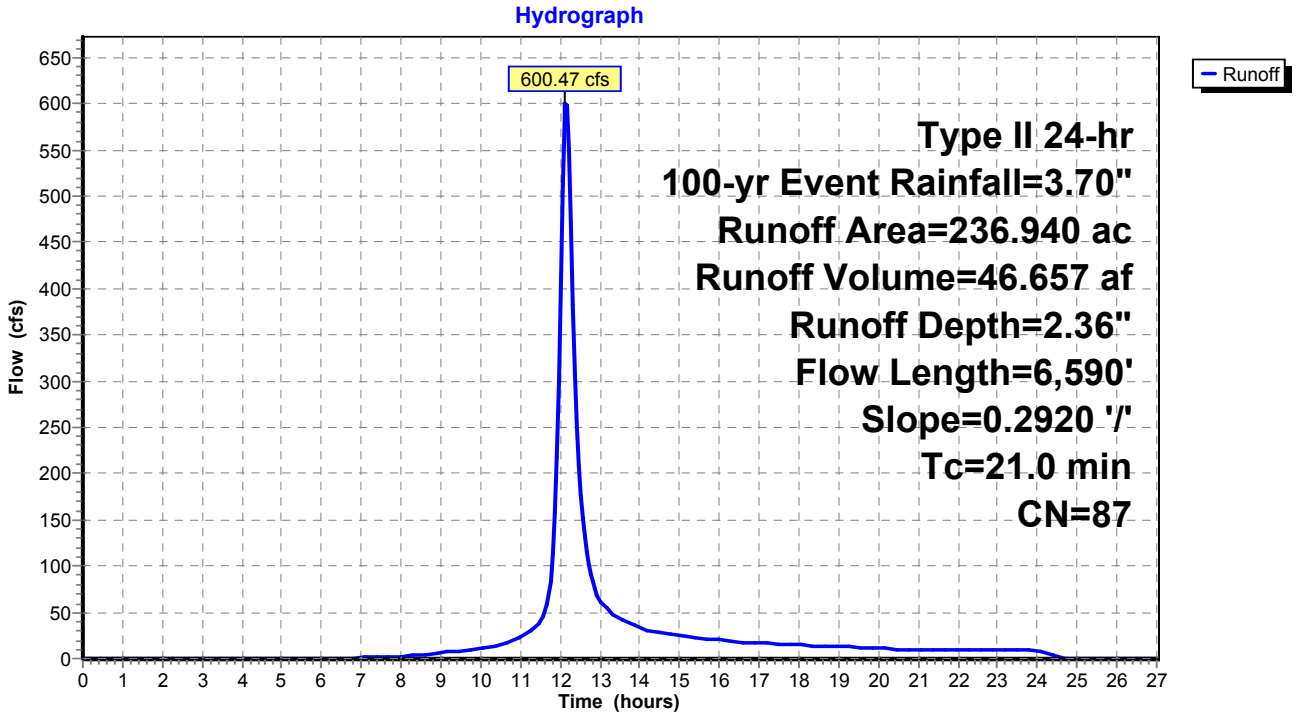
Runoff = 600.47 cfs @ 12.14 hrs, Volume= 46.657 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	213.250	86	Desert shrub range, Fair, HSG D
*	23.690	98	Impervious, HSG D
	236.940	87	Weighted Average
	213.250		90.00% Pervious Area
	23.690		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0	6,590	0.2920	5.24		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

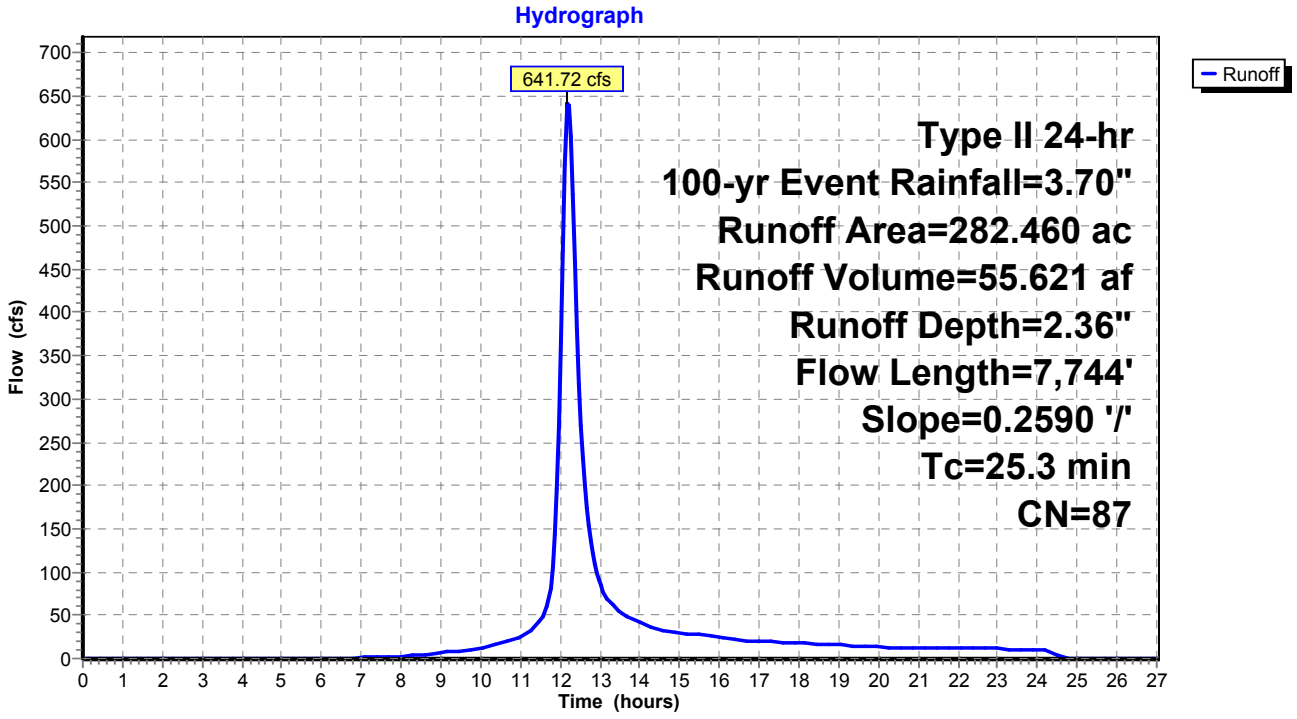
Runoff = 641.72 cfs @ 12.18 hrs, Volume= 55.621 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	254.210	86	Desert shrub range, Fair, HSG D
*	28.250	98	Impervious, HSG D
	282.460	87	Weighted Average
	254.210		90.00% Pervious Area
	28.250		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	7,744	0.2590	5.10		**Lag/CN Method,**

Subcatchment 13: WS 13



Summary for Subcatchment 14: WS 14

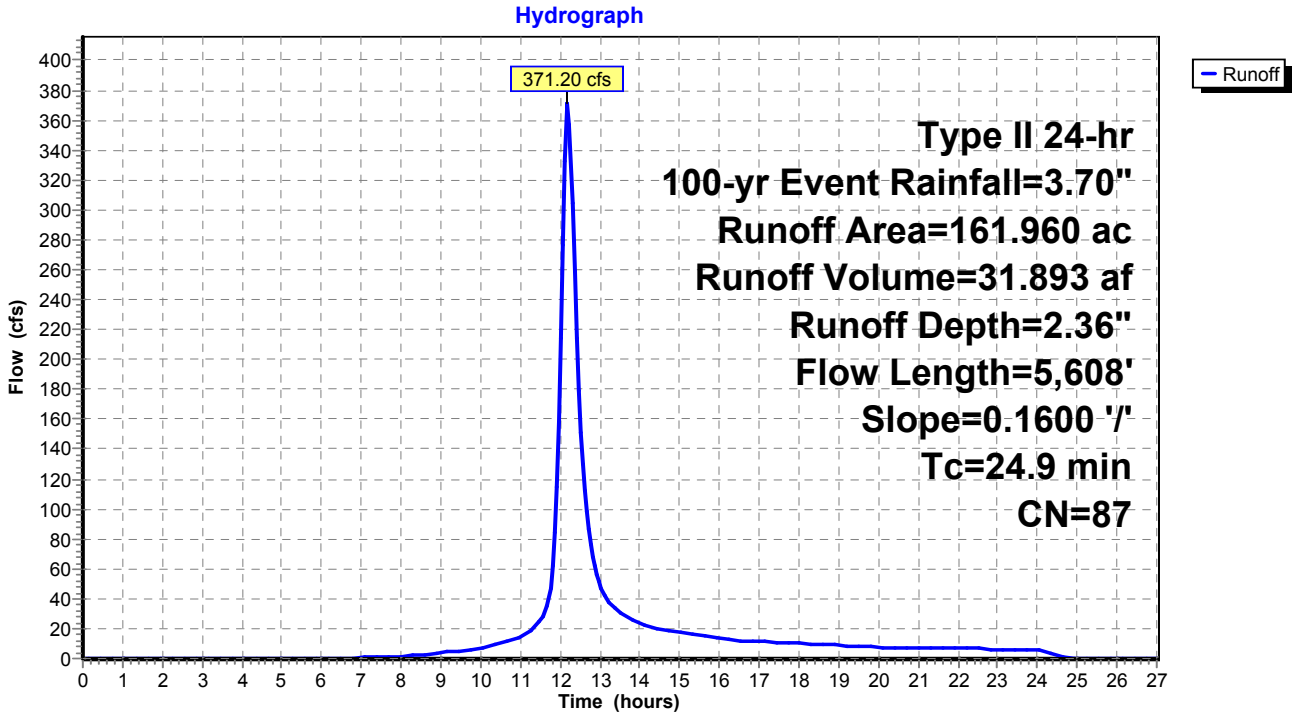
Runoff = 371.20 cfs @ 12.18 hrs, Volume= 31.893 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	145.760	86	Desert shrub range, Fair, HSG D
*	16.200	98	Impervious, HSG D
	161.960	87	Weighted Average
	145.760		90.00% Pervious Area
	16.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	5,608	0.1600	3.75		**Lag/CN Method,**

Subcatchment 14: WS 14



Existing Watersheds (Pre-Quintana) *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 15: WS 15

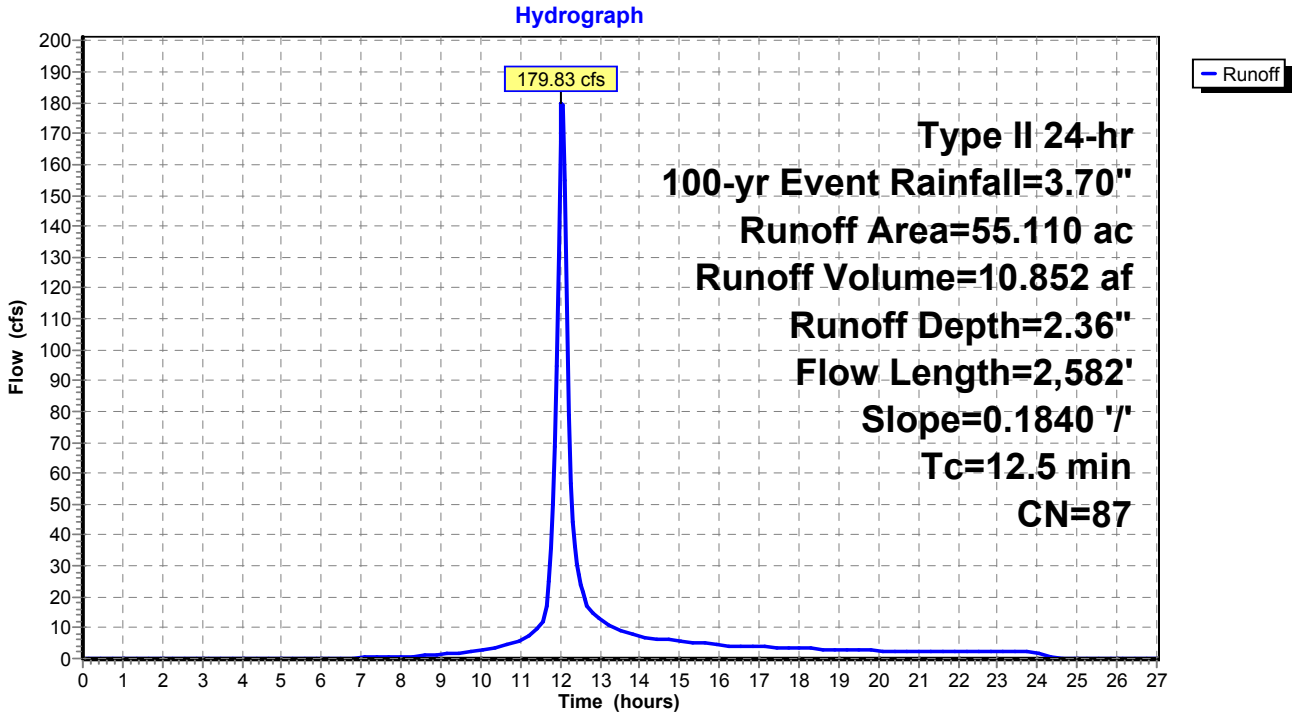
Runoff = 179.83 cfs @ 12.04 hrs, Volume= 10.852 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	49.600	86	Desert shrub range, Fair, HSG D
*	5.510	98	Impervious, HSG D
	55.110	87	Weighted Average
	49.600		90.00% Pervious Area
	5.510		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	2,582	0.1840	3.45		**Lag/CN Method,**

Subcatchment 15: WS 15



Summary for Subcatchment 16: WS 16

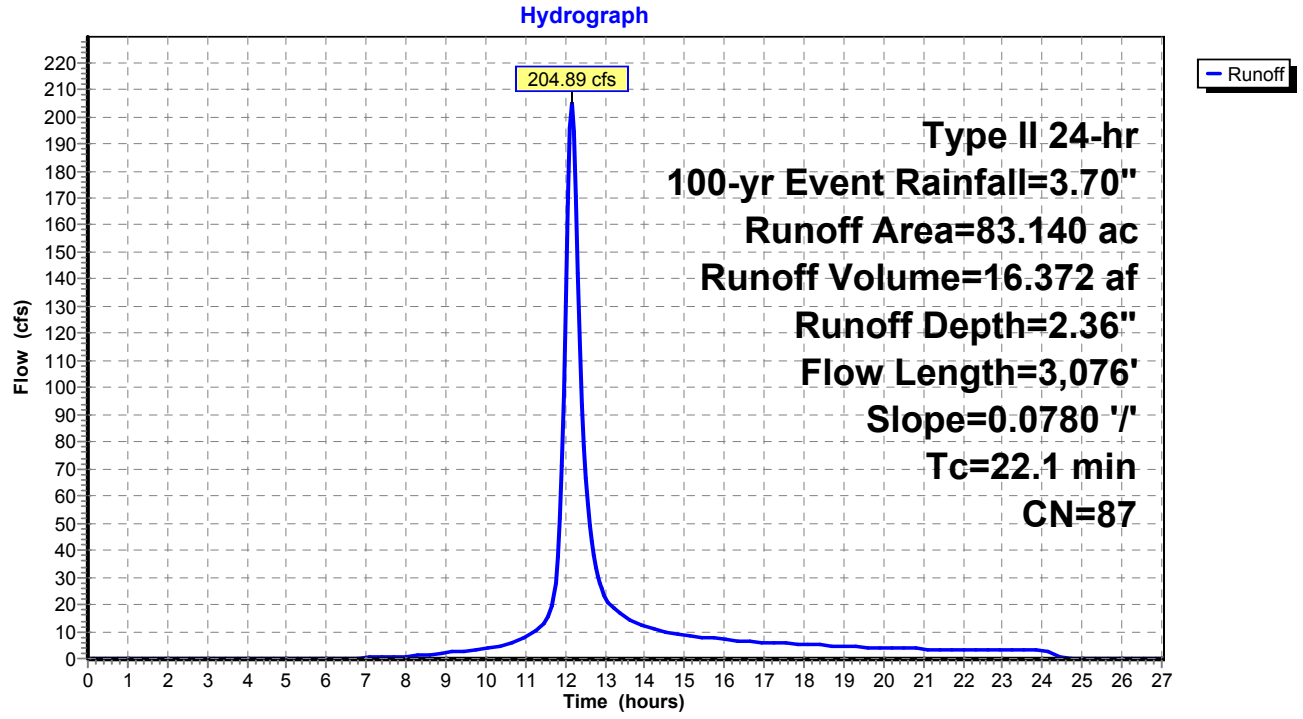
Runoff = 204.89 cfs @ 12.15 hrs, Volume= 16.372 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	74.830	86	Desert shrub range, Fair, HSG D
*	8.310	98	Impervious, HSG D
	83.140	87	Weighted Average
	74.830		90.00% Pervious Area
	8.310		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.1	3,076	0.0780	2.32		**Lag/CN Method,**

Subcatchment 16: WS 16



Existing Watersheds (Pre-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=352.000 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,396' Slope=0.1640 '/' Tc=30.7 min CN=87 Runoff=813.94 cfs 79.767 af

Subcatchment2: WS 2 Runoff Area=117.790 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,175' Slope=0.2310 '/' Tc=13.1 min CN=87 Runoff=432.11 cfs 26.693 af

Subcatchment3: WS 3 Runoff Area=100.970 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=4,242' Slope=0.1940 '/' Tc=18.1 min CN=87 Runoff=318.42 cfs 22.881 af

Subcatchment4: WS 4 Runoff Area=85.030 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,389' Slope=0.3050 '/' Tc=12.1 min CN=87 Runoff=321.62 cfs 19.269 af

Subcatchment5: WS 5 Runoff Area=107.360 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=4,088' Slope=0.3460 '/' Tc=13.1 min CN=87 Runoff=393.85 cfs 24.329 af

Subcatchment6: WS 6 Runoff Area=377.540 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=9,338' Slope=0.2670 '/' Tc=29.0 min CN=87 Runoff=906.94 cfs 85.555 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=5,064' Slope=0.2780 '/' Tc=17.4 min CN=87 Runoff=464.86 cfs 32.739 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=334.29 cfs 20.851 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=651.70 cfs 53.460 af

Subcatchment10: WS 10 Runoff Area=333.620 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=10,278' Slope=0.2630 '/' Tc=31.5 min CN=87 Runoff=758.38 cfs 75.602 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=968.42 cfs 90.153 af

Subcatchment12: WS 12 Runoff Area=236.940 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=6,590' Slope=0.2920 '/' Tc=21.0 min CN=87 Runoff=688.82 cfs 53.693 af

Subcatchment13: WS 13 Runoff Area=282.460 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,744' Slope=0.2590 '/' Tc=25.3 min CN=87 Runoff=736.61 cfs 64.009 af

Subcatchment14: WS 14 Runoff Area=161.960 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=5,608' Slope=0.1600 '/' Tc=24.9 min CN=87 Runoff=426.07 cfs 36.702 af

Subcatchment15: WS 15 Runoff Area=55.110 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=2,582' Slope=0.1840 '/' Tc=12.5 min CN=87 Runoff=205.93 cfs 12.489 af

Subcatchment16: WS 16 Runoff Area=83.140 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,076' Slope=0.0780 '/' Tc=22.1 min CN=87 Runoff=235.08 cfs 18.841 af

Total Runoff Area = 3,164.140 ac Runoff Volume = 717.031 af Average Runoff Depth = 2.72"
90.00% Pervious = 2,847.730 ac 10.00% Impervious = 316.410 ac

Existing Watersheds (Pre-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 1: WS 1

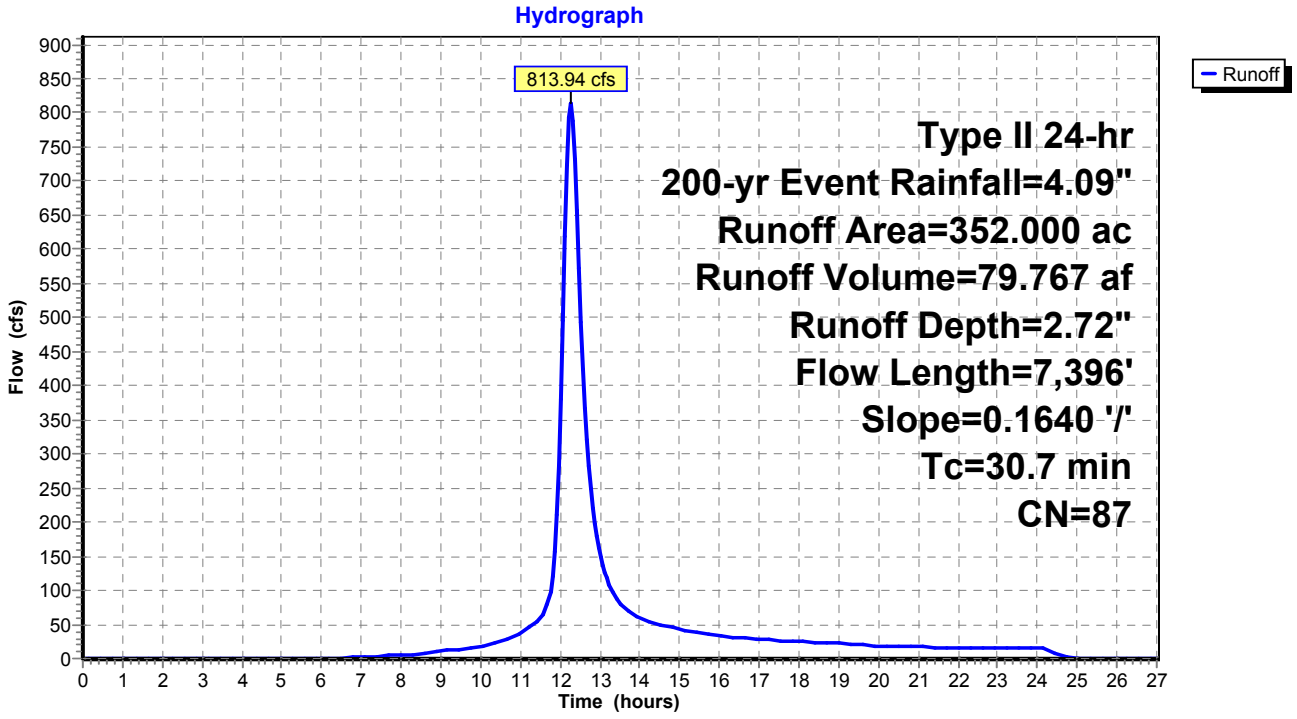
Runoff = 813.94 cfs @ 12.25 hrs, Volume= 79.767 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	316.800	86	Desert shrub range, Fair, HSG D
*	35.200	98	Impervious, HSG D
	352.000	87	Weighted Average
	316.800		90.00% Pervious Area
	35.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	7,396	0.1640	4.02		**Lag/CN Method,**

Subcatchment 1: WS 1



Summary for Subcatchment 2: WS 2

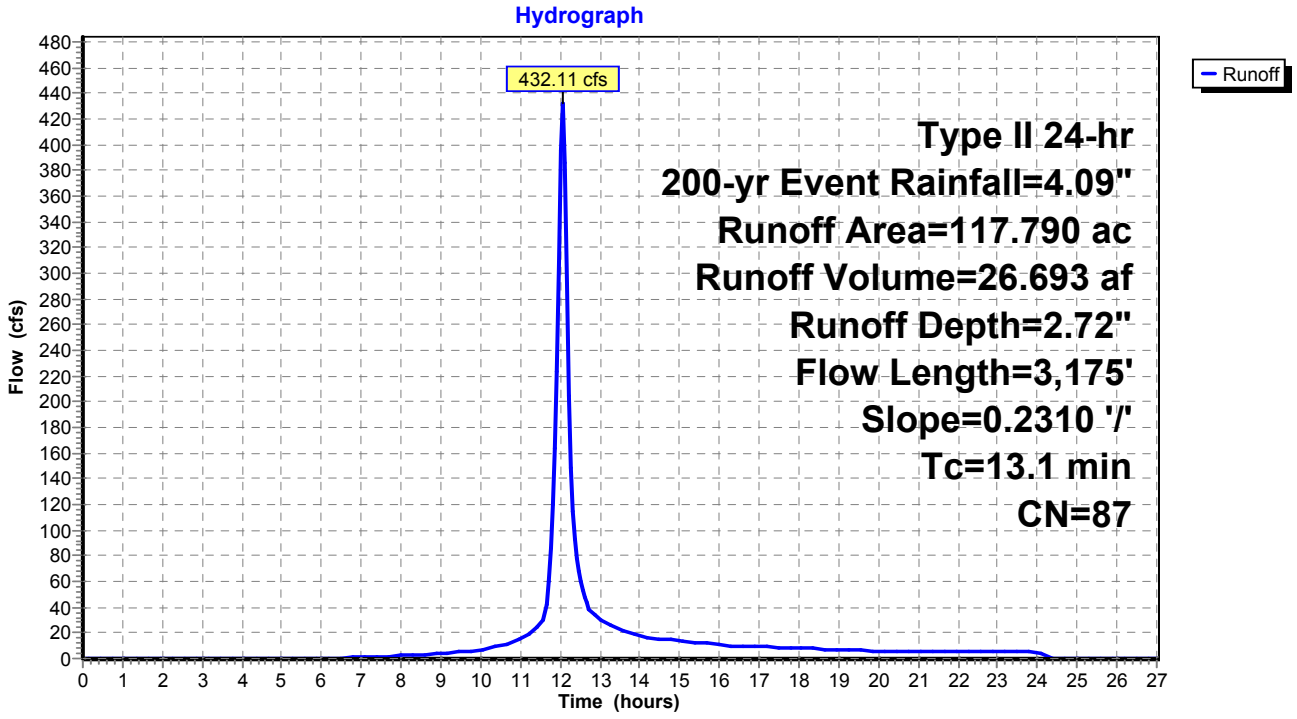
Runoff = 432.11 cfs @ 12.05 hrs, Volume= 26.693 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	106.010	86	Desert shrub range, Fair, HSG D
*	11.780	98	Impervious, HSG D
	117.790	87	Weighted Average
	106.010		90.00% Pervious Area
	11.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	3,175	0.2310	4.03		**Lag/CN Method,**

Subcatchment 2: WS 2



Summary for Subcatchment 3: WS 3

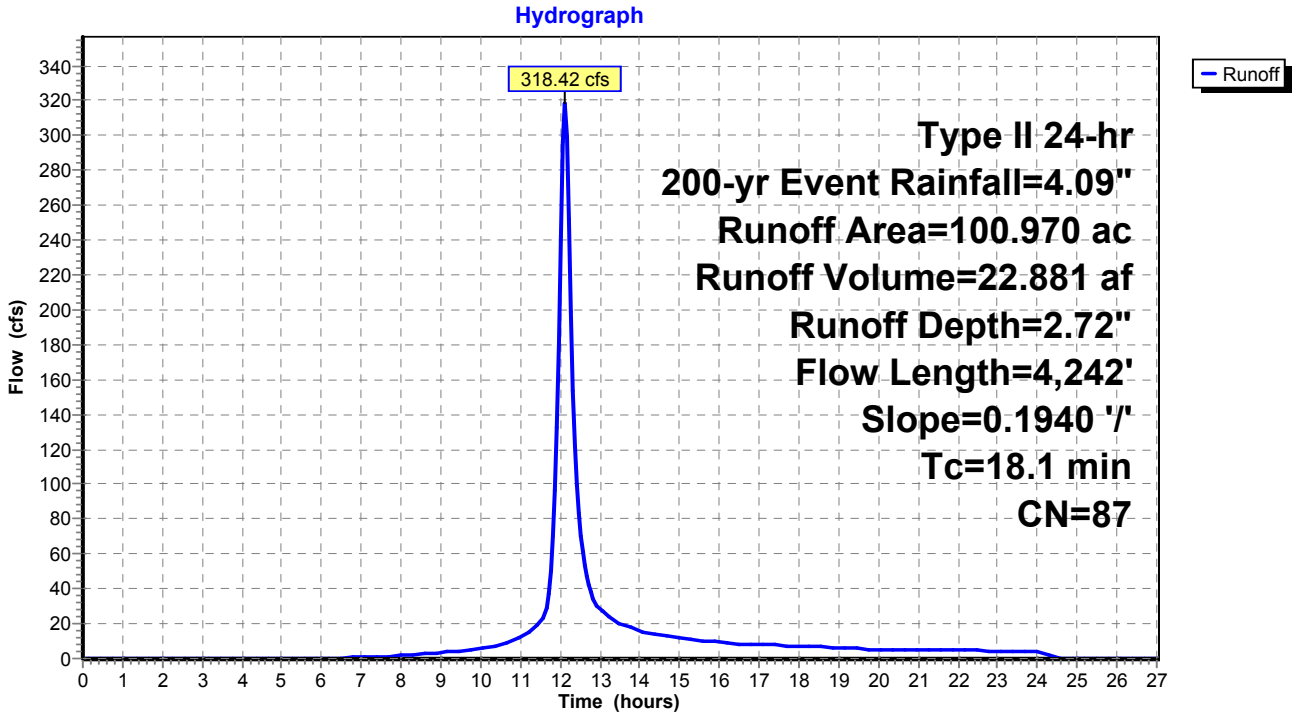
Runoff = 318.42 cfs @ 12.10 hrs, Volume= 22.881 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	90.870	86	Desert shrub range, Fair, HSG D
*	10.100	98	Impervious, HSG D
	100.970	87	Weighted Average
	90.870		90.00% Pervious Area
	10.100		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	4,242	0.1940	3.91		**Lag/CN Method,**

Subcatchment 3: WS 3



Summary for Subcatchment 4: WS 4

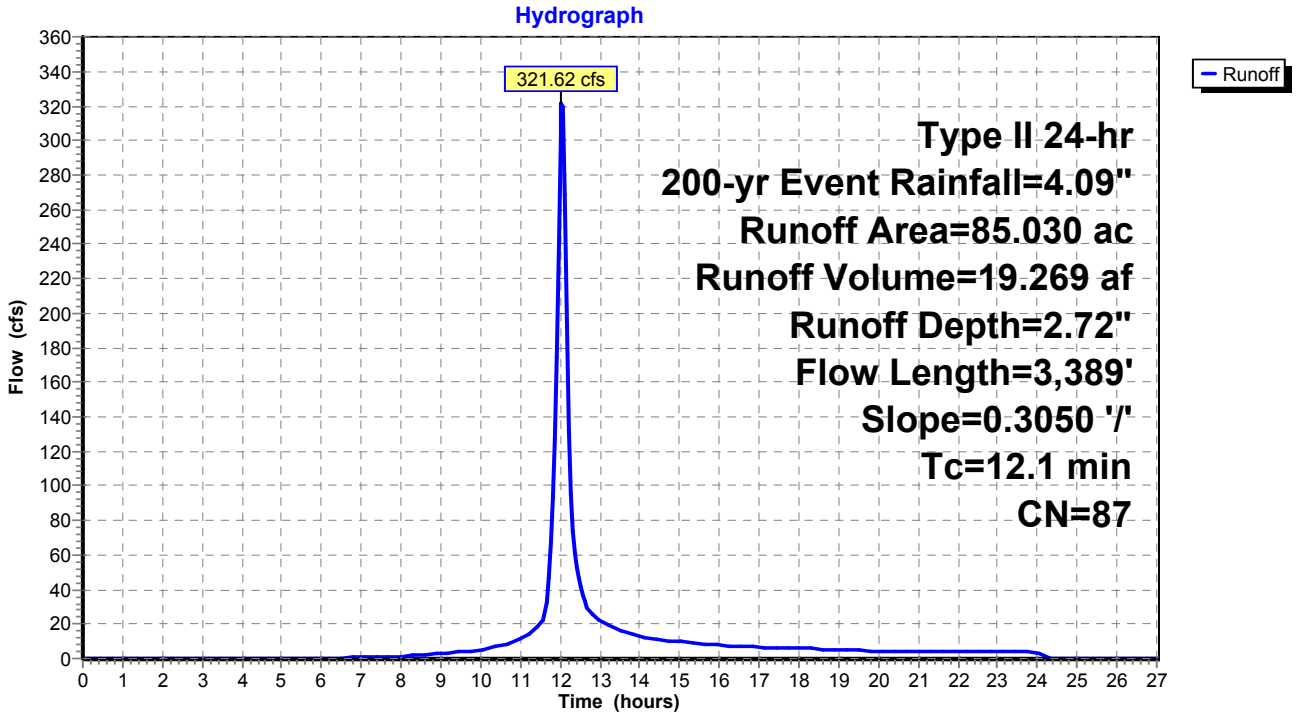
Runoff = 321.62 cfs @ 12.04 hrs, Volume= 19.269 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	76.530	86	Desert shrub range, Fair, HSG D
*	8.500	98	Impervious, HSG D
	85.030	87	Weighted Average
	76.530		90.00% Pervious Area
	8.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	3,389	0.3050	4.69		**Lag/CN Method,**

Subcatchment 4: WS 4



Existing Watersheds (Pre-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 5: WS 5

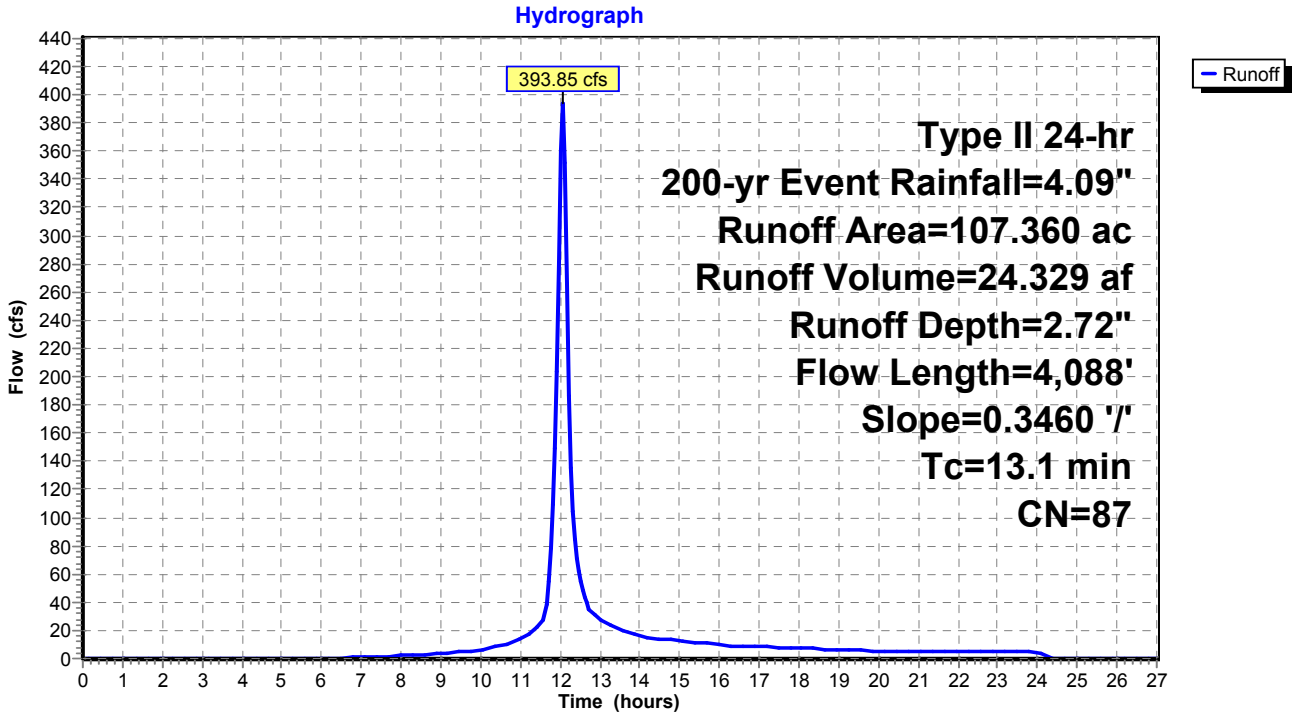
Runoff = 393.85 cfs @ 12.05 hrs, Volume= 24.329 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	96.620	86	Desert shrub range, Fair, HSG D
*	10.740	98	Impervious, HSG D
	107.360	87	Weighted Average
	96.620		90.00% Pervious Area
	10.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	4,088	0.3460	5.18		**Lag/CN Method,**

Subcatchment 5: WS 5



Summary for Subcatchment 6: WS 6

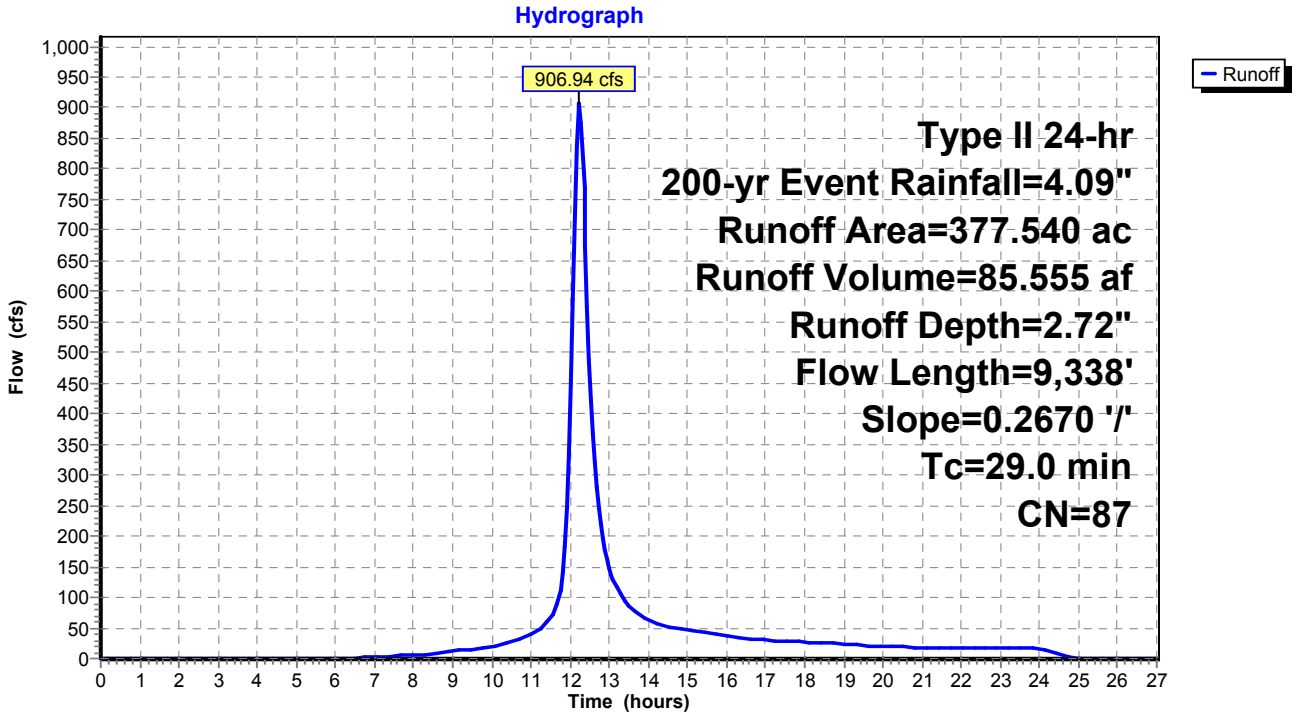
Runoff = 906.94 cfs @ 12.22 hrs, Volume= 85.555 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	339.790	86	Desert shrub range, Fair, HSG D
*	37.750	98	Impervious, HSG D
	377.540	87	Weighted Average
	339.790		90.00% Pervious Area
	37.750		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.0	9,338	0.2670	5.37		**Lag/CN Method,**

Subcatchment 6: WS 6



Summary for Subcatchment 7: WS 7

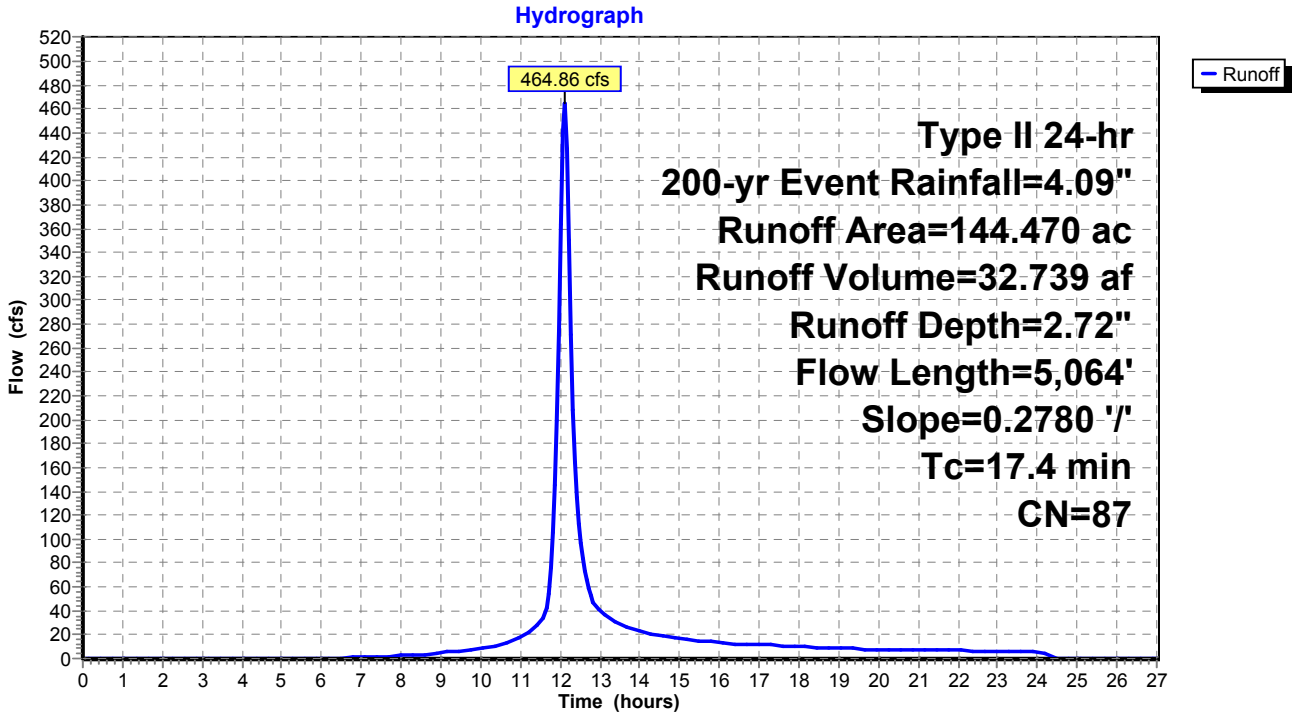
Runoff = 464.86 cfs @ 12.09 hrs, Volume= 32.739 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	5,064	0.2780	4.85		**Lag/CN Method,**

Subcatchment 7: WS 7



Summary for Subcatchment 8: WS 8

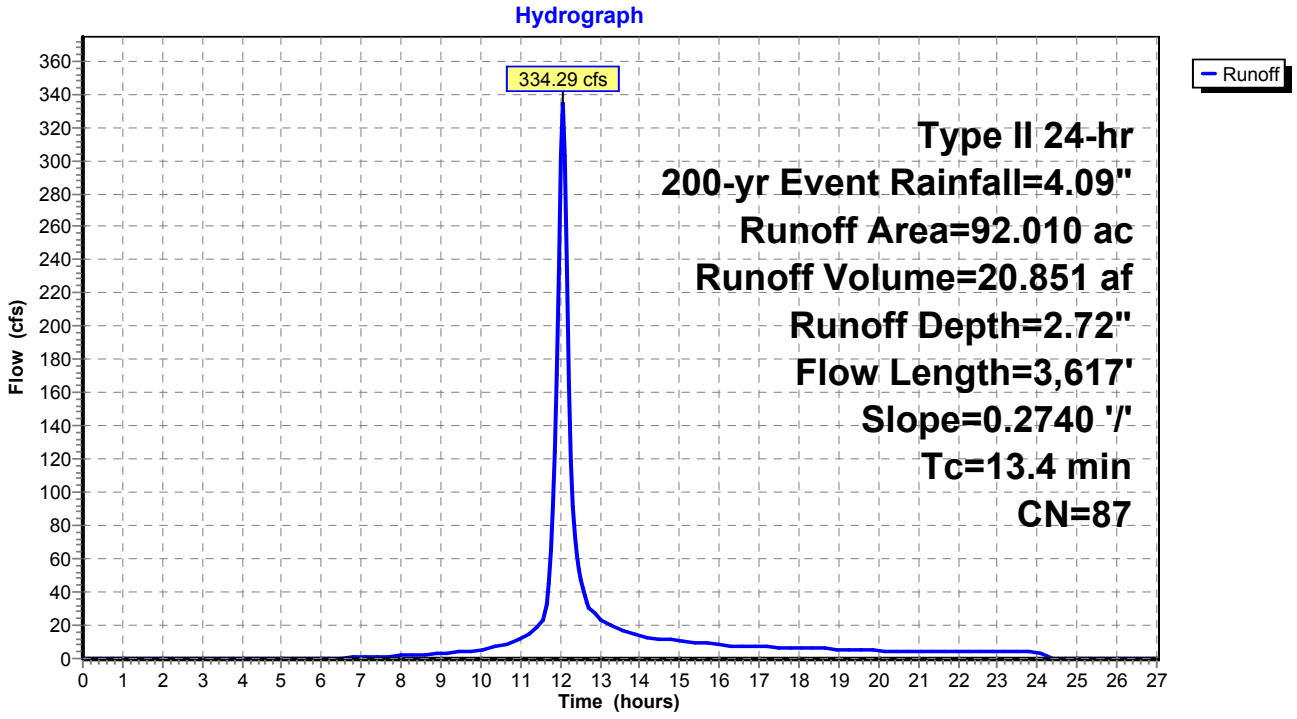
Runoff = 334.29 cfs @ 12.05 hrs, Volume= 20.851 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

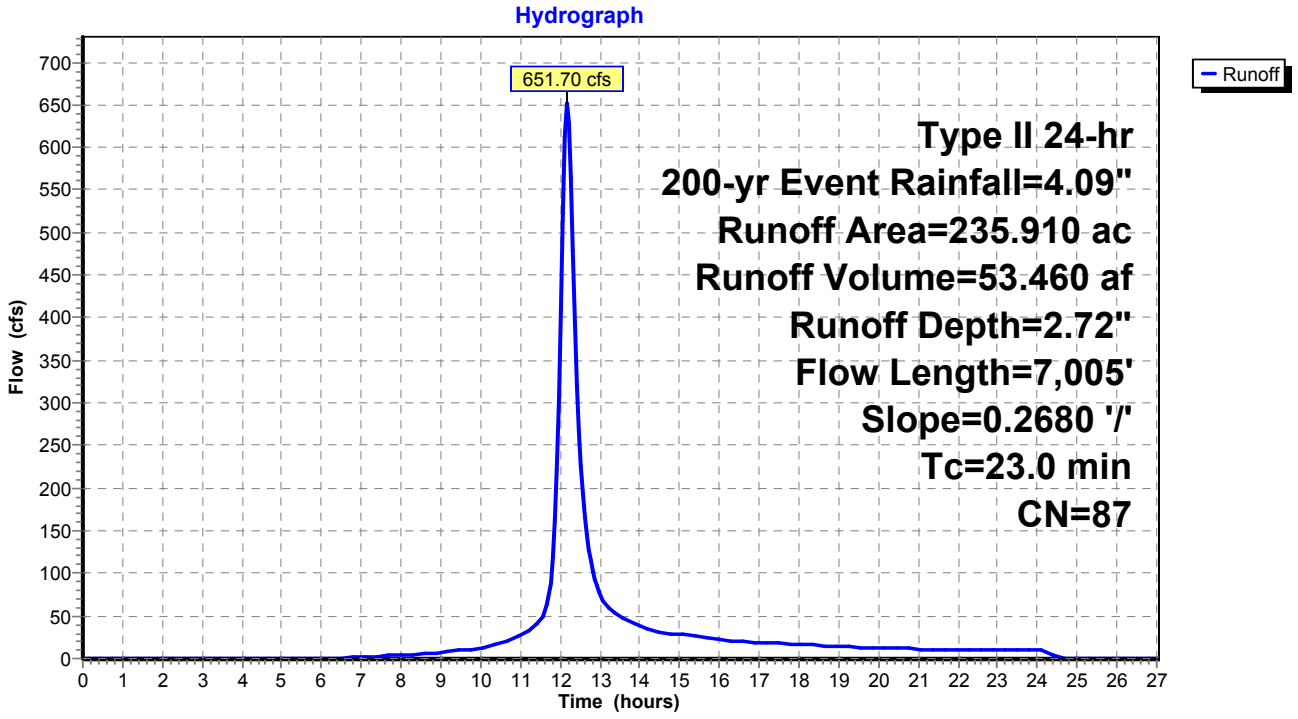
Runoff = 651.70 cfs @ 12.16 hrs, Volume= 53.460 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Summary for Subcatchment 10: WS 10

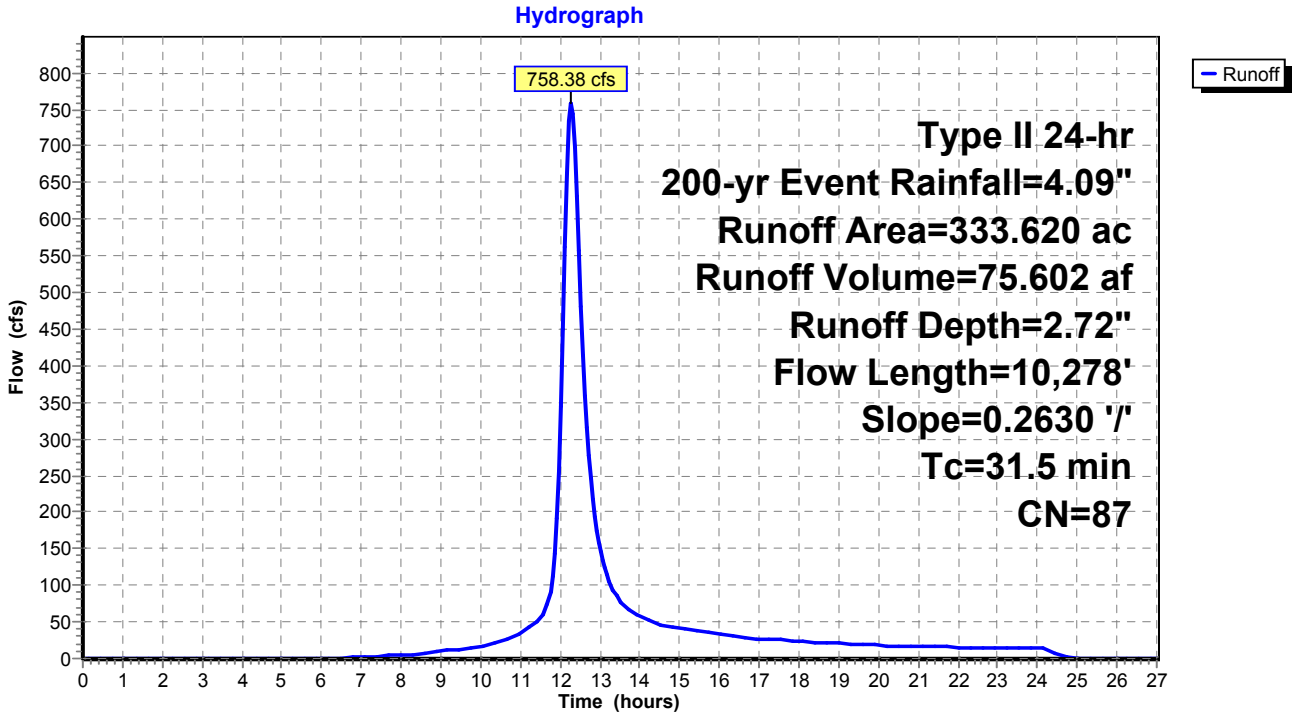
Runoff = 758.38 cfs @ 12.26 hrs, Volume= 75.602 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	300.260	86	Desert shrub range, Fair, HSG D
*	33.360	98	Impervious, HSG D
	333.620	87	Weighted Average
	300.260		90.00% Pervious Area
	33.360		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	10,278	0.2630	5.43		**Lag/CN Method,**

Subcatchment 10: WS 10



Summary for Subcatchment 11: WS 11

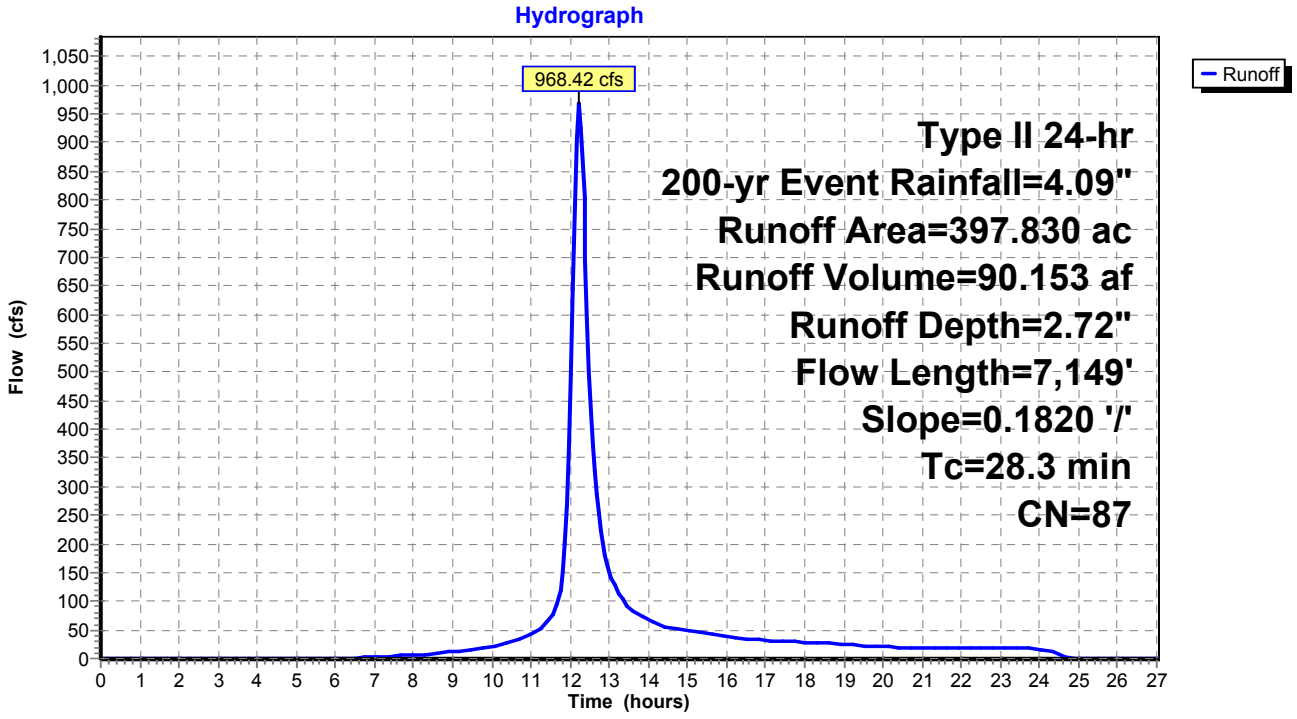
Runoff = 968.42 cfs @ 12.22 hrs, Volume= 90.153 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Existing Watersheds (Pre-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 12: WS 12

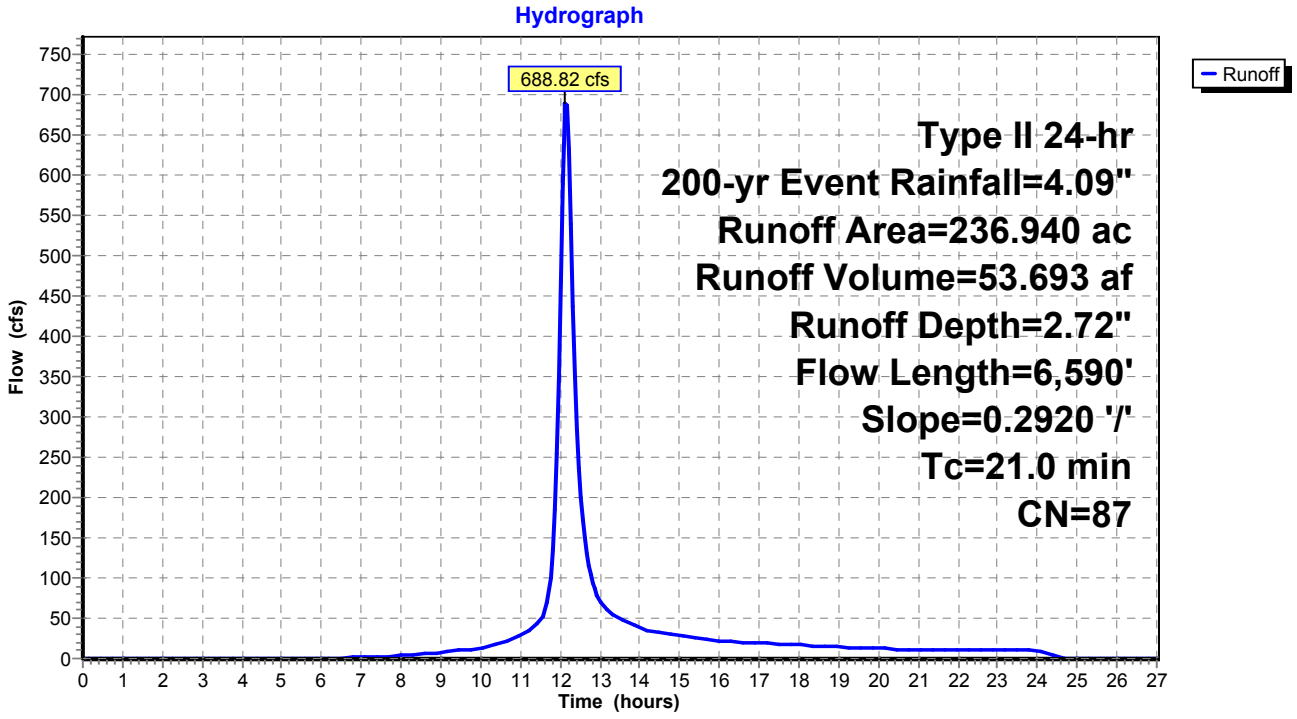
Runoff = 688.82 cfs @ 12.13 hrs, Volume= 53.693 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	213.250	86	Desert shrub range, Fair, HSG D
*	23.690	98	Impervious, HSG D
	236.940	87	Weighted Average
	213.250		90.00% Pervious Area
	23.690		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0	6,590	0.2920	5.24		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

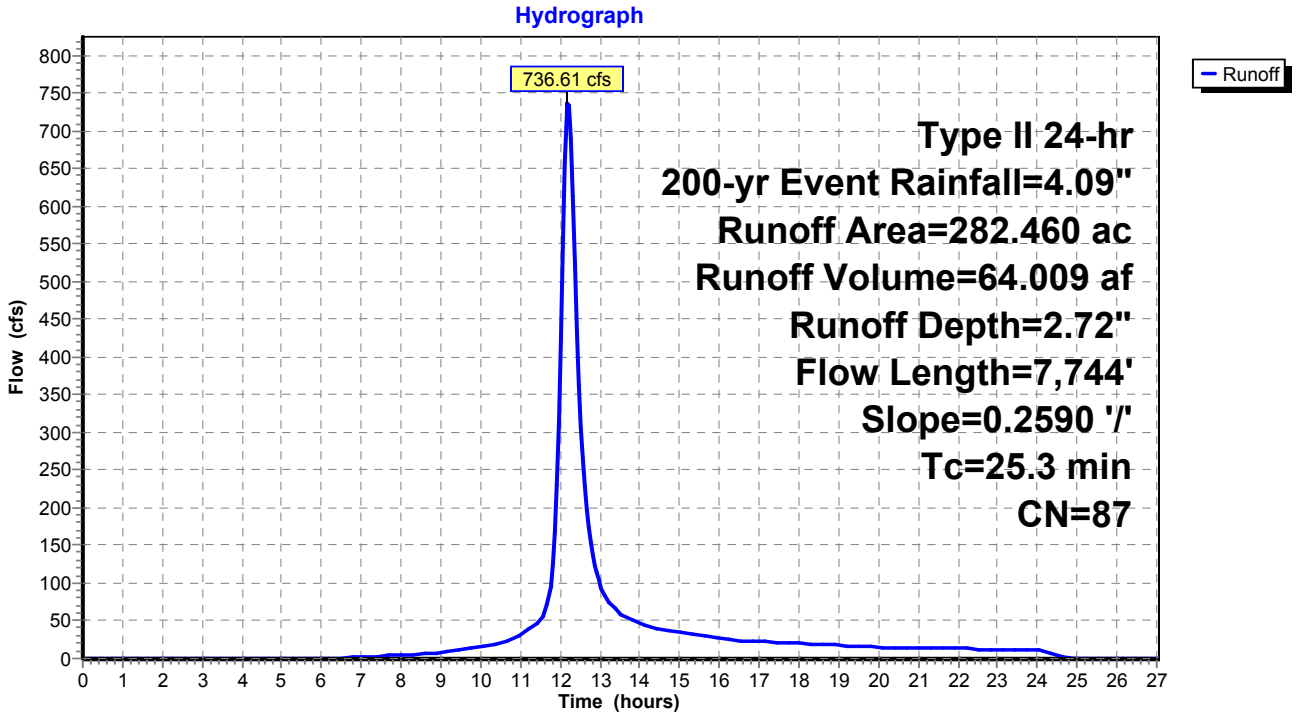
Runoff = 736.61 cfs @ 12.18 hrs, Volume= 64.009 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	254.210	86	Desert shrub range, Fair, HSG D
*	28.250	98	Impervious, HSG D
	282.460	87	Weighted Average
	254.210		90.00% Pervious Area
	28.250		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	7,744	0.2590	5.10		**Lag/CN Method,**

Subcatchment 13: WS 13



Existing Watersheds (Pre-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 14: WS 14

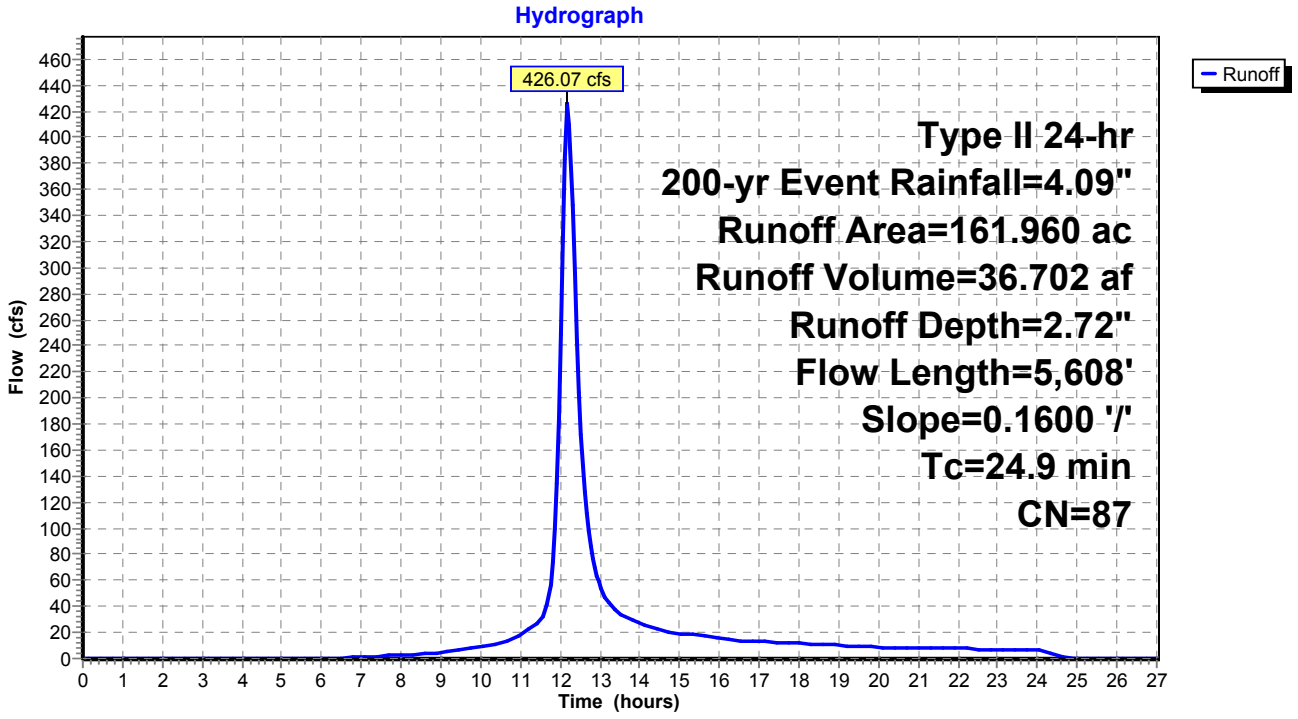
Runoff = 426.07 cfs @ 12.18 hrs, Volume= 36.702 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	145.760	86	Desert shrub range, Fair, HSG D
*	16.200	98	Impervious, HSG D
	161.960	87	Weighted Average
	145.760		90.00% Pervious Area
	16.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	5,608	0.1600	3.75		**Lag/CN Method,**

Subcatchment 14: WS 14



Summary for Subcatchment 15: WS 15

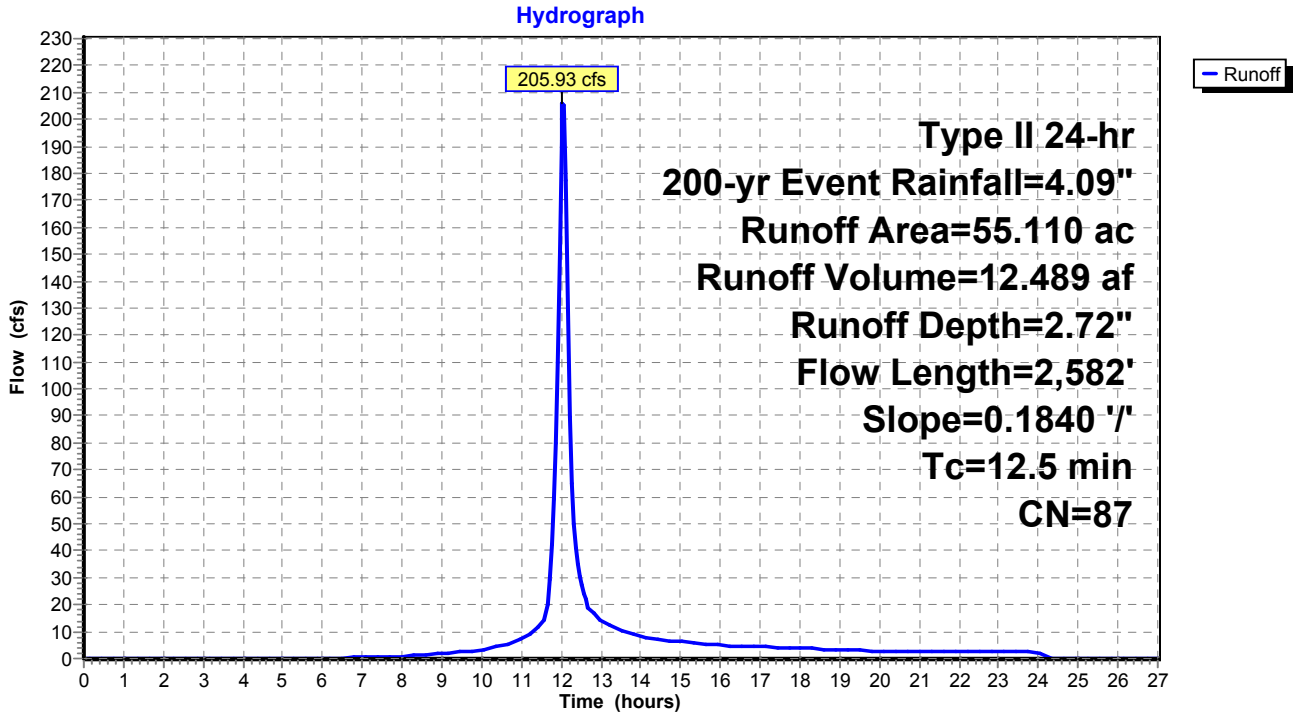
Runoff = 205.93 cfs @ 12.04 hrs, Volume= 12.489 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	49.600	86	Desert shrub range, Fair, HSG D
*	5.510	98	Impervious, HSG D
	55.110	87	Weighted Average
	49.600		90.00% Pervious Area
	5.510		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	2,582	0.1840	3.45		**Lag/CN Method,**

Subcatchment 15: WS 15



Summary for Subcatchment 16: WS 16

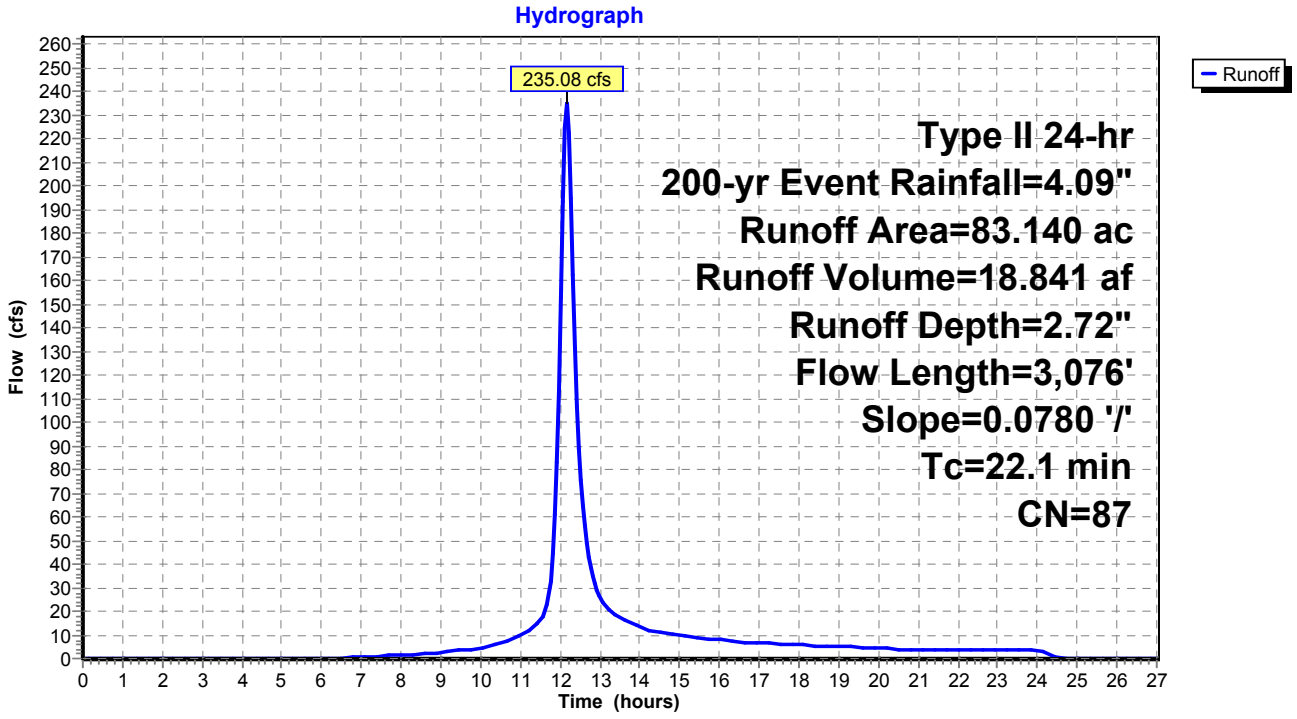
Runoff = 235.08 cfs @ 12.15 hrs, Volume= 18.841 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	74.830	86	Desert shrub range, Fair, HSG D
*	8.310	98	Impervious, HSG D
	83.140	87	Weighted Average
	74.830		90.00% Pervious Area
	8.310		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.1	3,076	0.0780	2.32		**Lag/CN Method,**

Subcatchment 16: WS 16



Existing Watersheds (Pre-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=352.000 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,396' Slope=0.1640 '/' Tc=30.7 min CN=87 Runoff=952.23 cfs 93.637 af

Subcatchment2: WS 2 Runoff Area=117.790 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,175' Slope=0.2310 '/' Tc=13.1 min CN=87 Runoff=504.05 cfs 31.334 af

Subcatchment3: WS 3 Runoff Area=100.970 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=4,242' Slope=0.1940 '/' Tc=18.1 min CN=87 Runoff=371.87 cfs 26.859 af

Subcatchment4: WS 4 Runoff Area=85.030 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,389' Slope=0.3050 '/' Tc=12.1 min CN=87 Runoff=375.03 cfs 22.619 af

Subcatchment5: WS 5 Runoff Area=107.360 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=4,088' Slope=0.3460 '/' Tc=13.1 min CN=87 Runoff=459.42 cfs 28.559 af

Subcatchment6: WS 6 Runoff Area=377.540 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=9,338' Slope=0.2670 '/' Tc=29.0 min CN=87 Runoff=1,060.97 cfs 100.431 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=5,064' Slope=0.2780 '/' Tc=17.4 min CN=87 Runoff=542.79 cfs 38.431 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=389.99 cfs 24.476 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=761.76 cfs 62.755 af

Subcatchment10: WS 10 Runoff Area=333.620 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=10,278' Slope=0.2630 '/' Tc=31.5 min CN=87 Runoff=887.32 cfs 88.748 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=1,132.73 cfs 105.828 af

Subcatchment12: WS 12 Runoff Area=236.940 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=6,590' Slope=0.2920 '/' Tc=21.0 min CN=87 Runoff=804.86 cfs 63.029 af

Subcatchment13: WS 13 Runoff Area=282.460 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,744' Slope=0.2590 '/' Tc=25.3 min CN=87 Runoff=861.28 cfs 75.138 af

Subcatchment14: WS 14 Runoff Area=161.960 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=5,608' Slope=0.1600 '/' Tc=24.9 min CN=87 Runoff=498.15 cfs 43.084 af

Subcatchment15: WS 15 Runoff Area=55.110 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=2,582' Slope=0.1840 '/' Tc=12.5 min CN=87 Runoff=240.16 cfs 14.660 af

Subcatchment16: WS 16 Runoff Area=83.140 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,076' Slope=0.0780 '/' Tc=22.1 min CN=87 Runoff=274.73 cfs 22.116 af

Total Runoff Area = 3,164.140 ac Runoff Volume = 841.705 af Average Runoff Depth = 3.19"
90.00% Pervious = 2,847.730 ac 10.00% Impervious = 316.410 ac

Summary for Subcatchment 1: WS 1

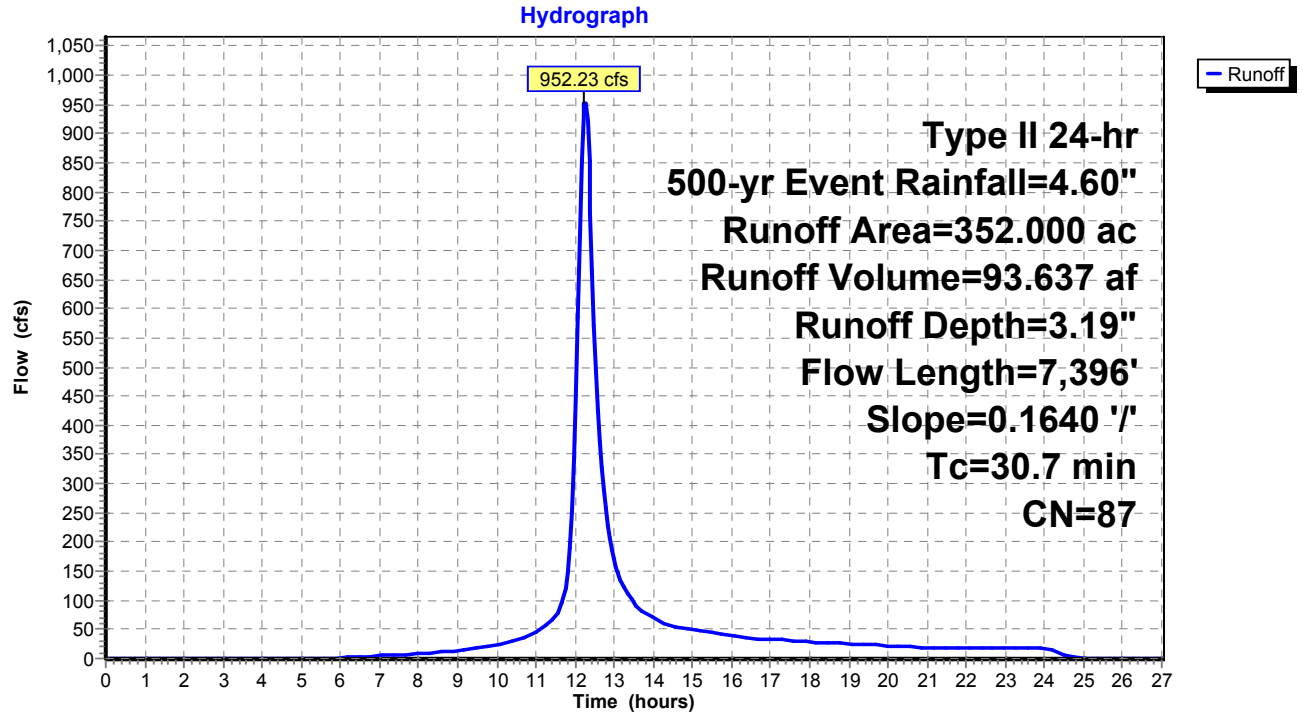
Runoff = 952.23 cfs @ 12.25 hrs, Volume= 93.637 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	316.800	86	Desert shrub range, Fair, HSG D
*	35.200	98	Impervious, HSG D
	352.000	87	Weighted Average
	316.800		90.00% Pervious Area
	35.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	7,396	0.1640	4.02		**Lag/CN Method,**

Subcatchment 1: WS 1



Summary for Subcatchment 2: WS 2

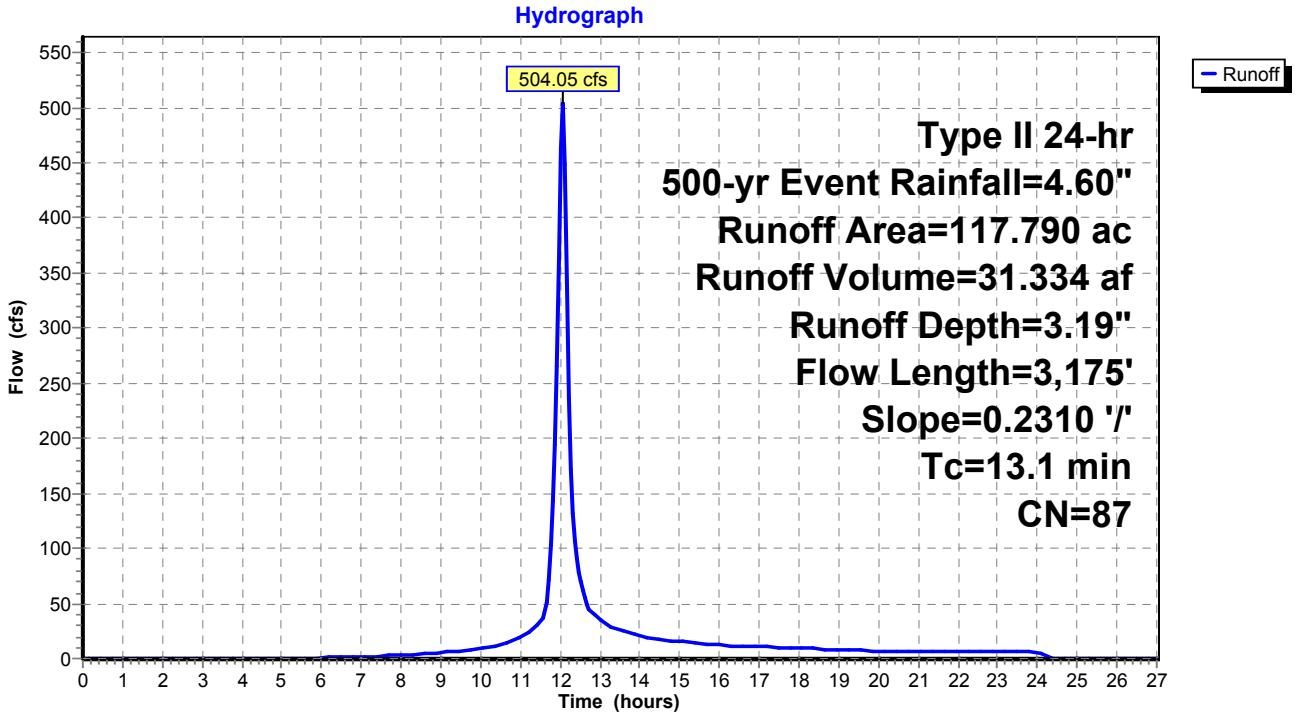
Runoff = 504.05 cfs @ 12.05 hrs, Volume= 31.334 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	106.010	86	Desert shrub range, Fair, HSG D
*	11.780	98	Impervious, HSG D
	117.790	87	Weighted Average
	106.010		90.00% Pervious Area
	11.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	3,175	0.2310	4.03		**Lag/CN Method,**

Subcatchment 2: WS 2



Summary for Subcatchment 3: WS 3

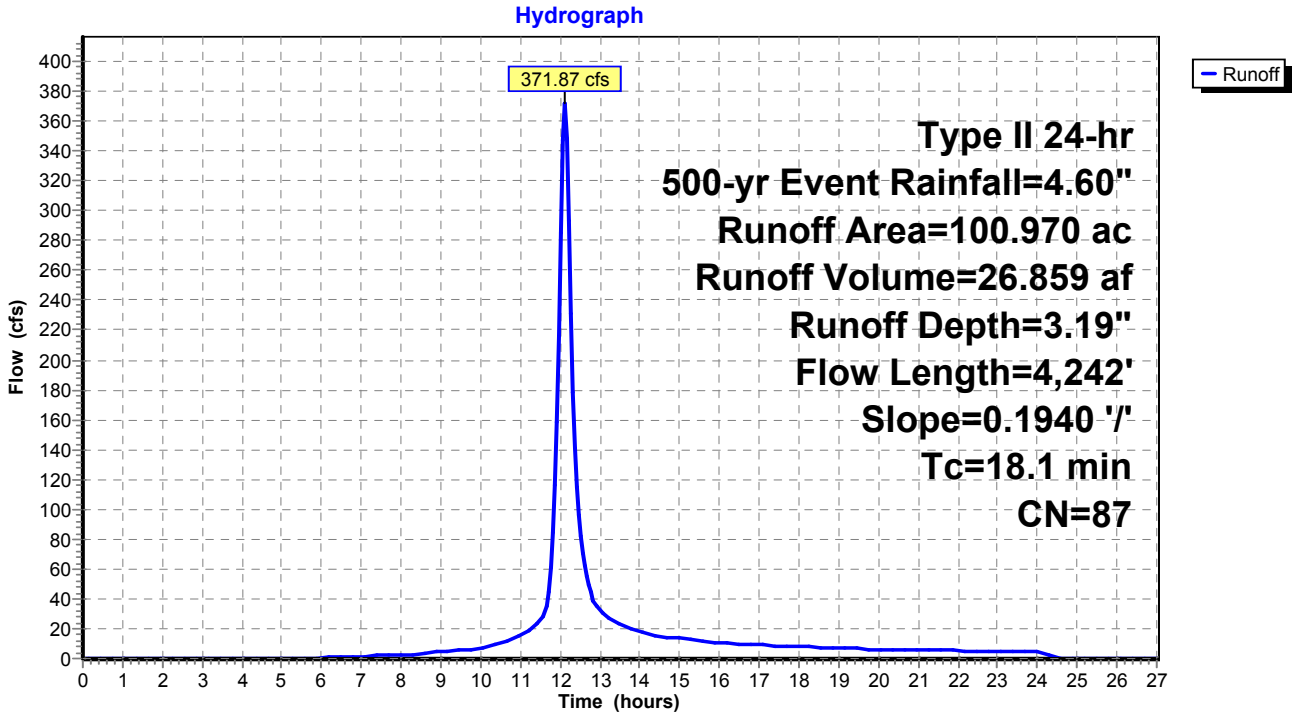
Runoff = 371.87 cfs @ 12.10 hrs, Volume= 26.859 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	90.870	86	Desert shrub range, Fair, HSG D
*	10.100	98	Impervious, HSG D
	100.970	87	Weighted Average
	90.870		90.00% Pervious Area
	10.100		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	4,242	0.1940	3.91		**Lag/CN Method,**

Subcatchment 3: WS 3



Summary for Subcatchment 4: WS 4

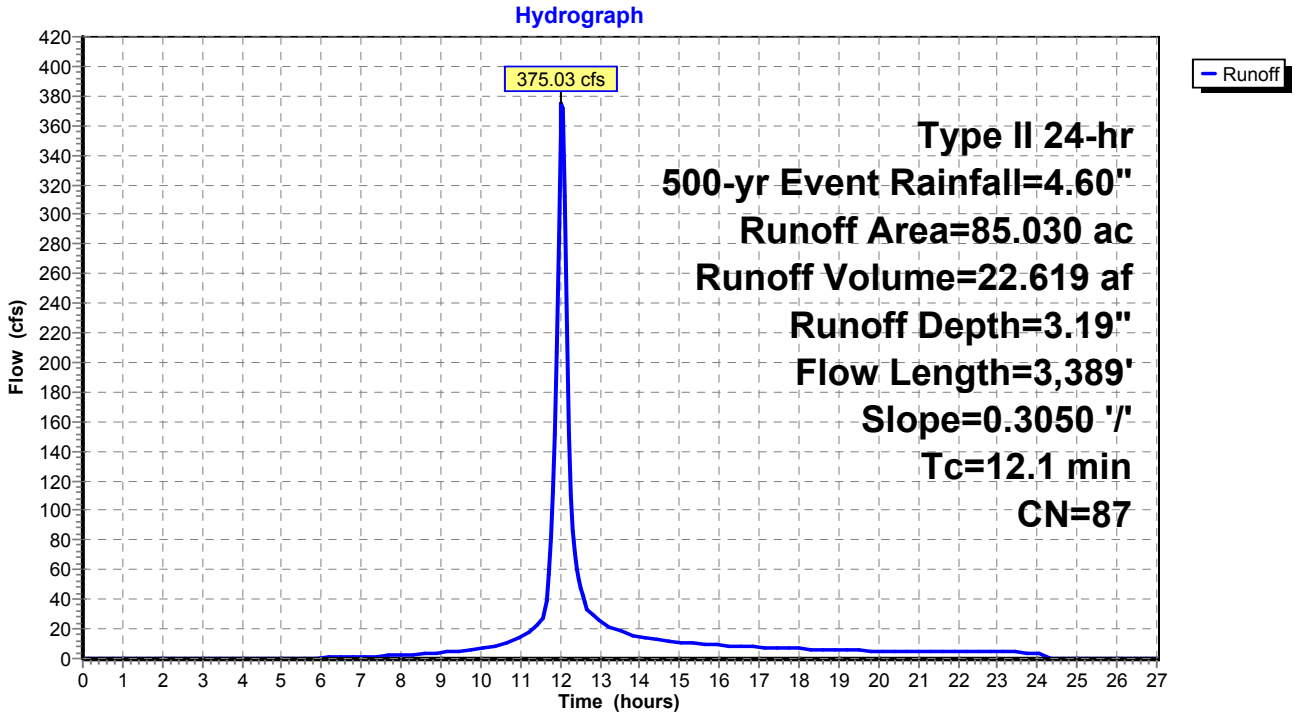
Runoff = 375.03 cfs @ 12.04 hrs, Volume= 22.619 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	76.530	86	Desert shrub range, Fair, HSG D
*	8.500	98	Impervious, HSG D
	85.030	87	Weighted Average
	76.530		90.00% Pervious Area
	8.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	3,389	0.3050	4.69		**Lag/CN Method,**

Subcatchment 4: WS 4



Existing Watersheds (Pre-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 5: WS 5

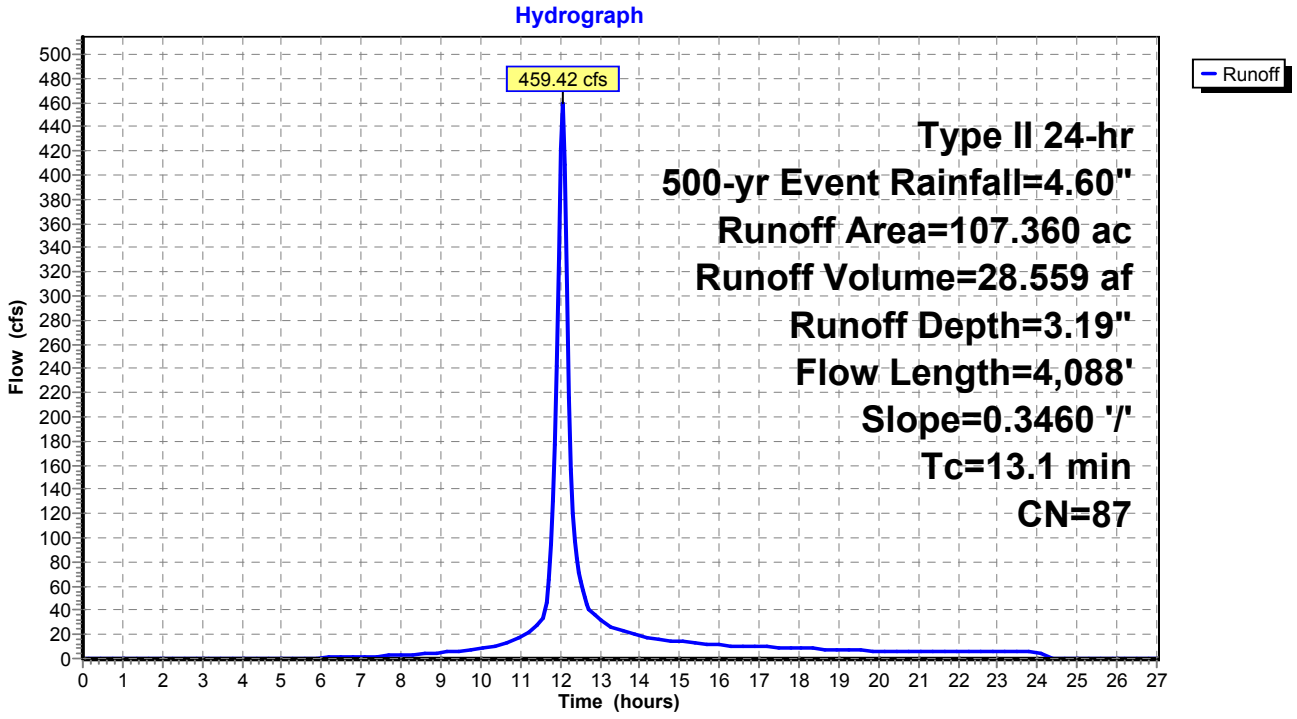
Runoff = 459.42 cfs @ 12.05 hrs, Volume= 28.559 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	96.620	86	Desert shrub range, Fair, HSG D
*	10.740	98	Impervious, HSG D
	107.360	87	Weighted Average
	96.620		90.00% Pervious Area
	10.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	4,088	0.3460	5.18		**Lag/CN Method,**

Subcatchment 5: WS 5



Summary for Subcatchment 6: WS 6

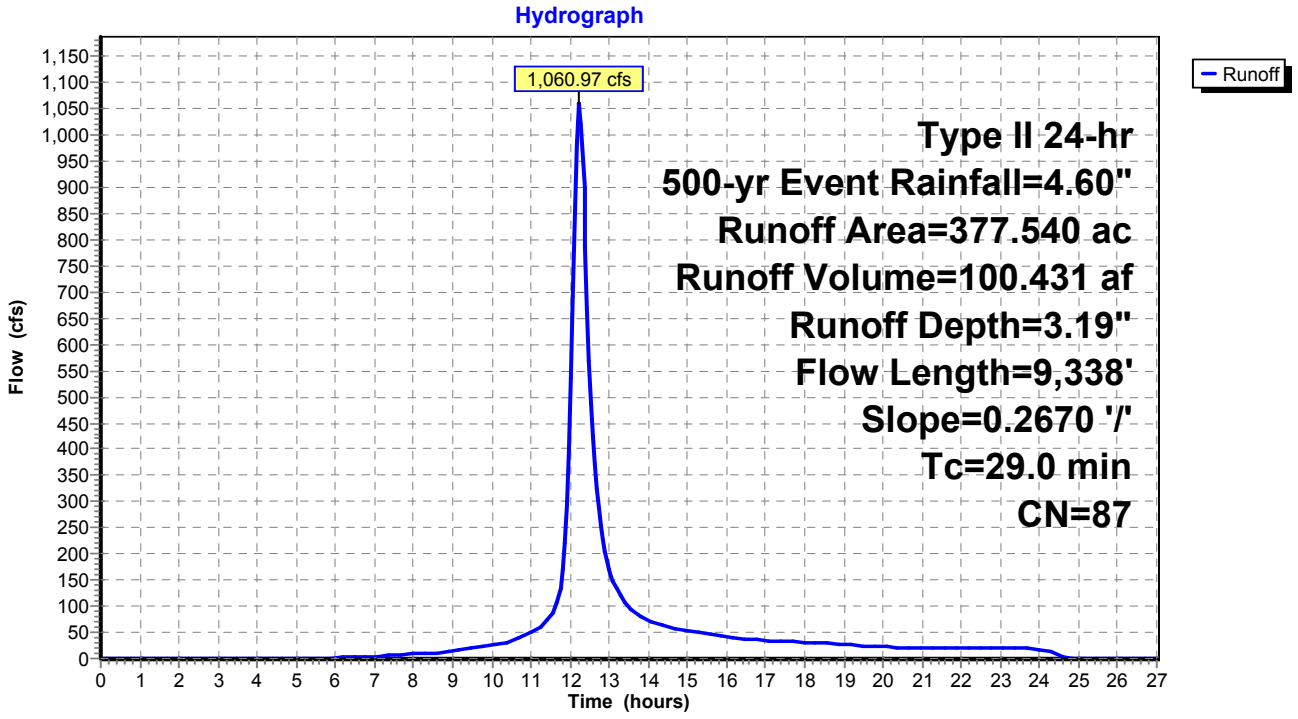
Runoff = 1,060.97 cfs @ 12.22 hrs, Volume= 100.431 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	339.790	86	Desert shrub range, Fair, HSG D
*	37.750	98	Impervious, HSG D
	377.540	87	Weighted Average
	339.790		90.00% Pervious Area
	37.750		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.0	9,338	0.2670	5.37		**Lag/CN Method,**

Subcatchment 6: WS 6



Summary for Subcatchment 7: WS 7

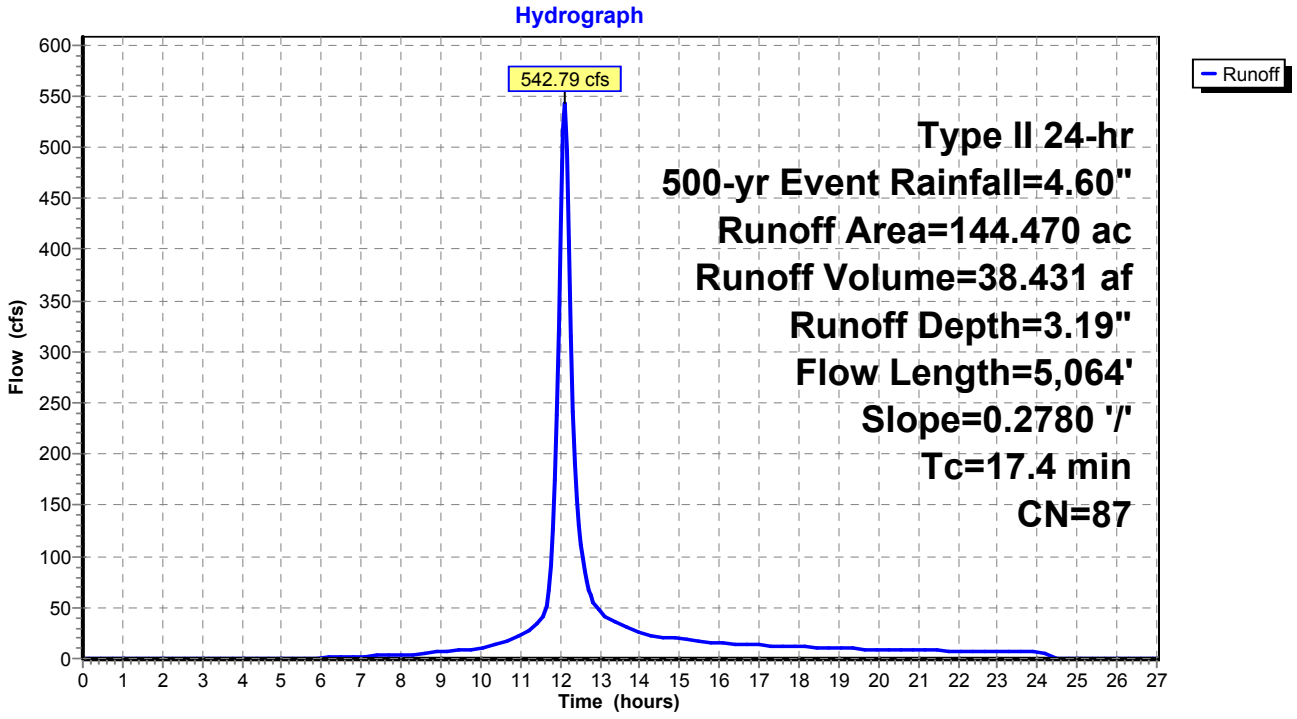
Runoff = 542.79 cfs @ 12.09 hrs, Volume= 38.431 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	5,064	0.2780	4.85		**Lag/CN Method,**

Subcatchment 7: WS 7



Existing Watersheds (Pre-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 8: WS 8

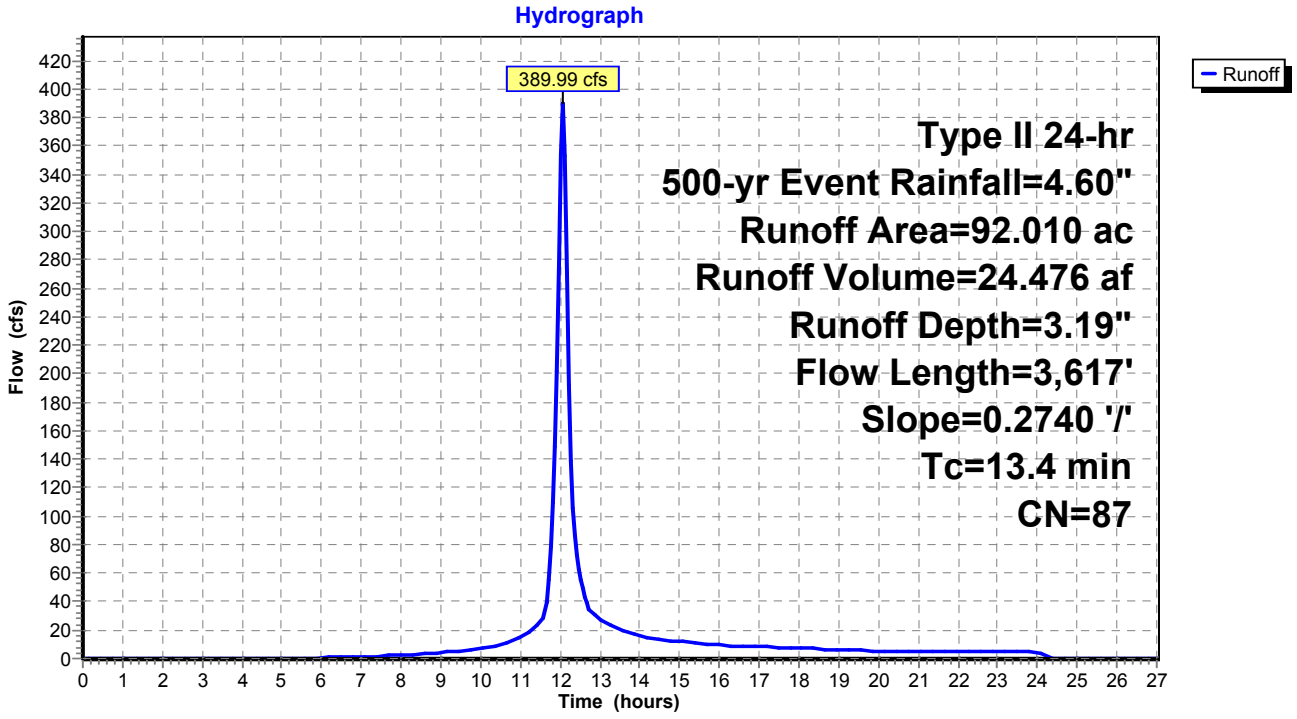
Runoff = 389.99 cfs @ 12.05 hrs, Volume= 24.476 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

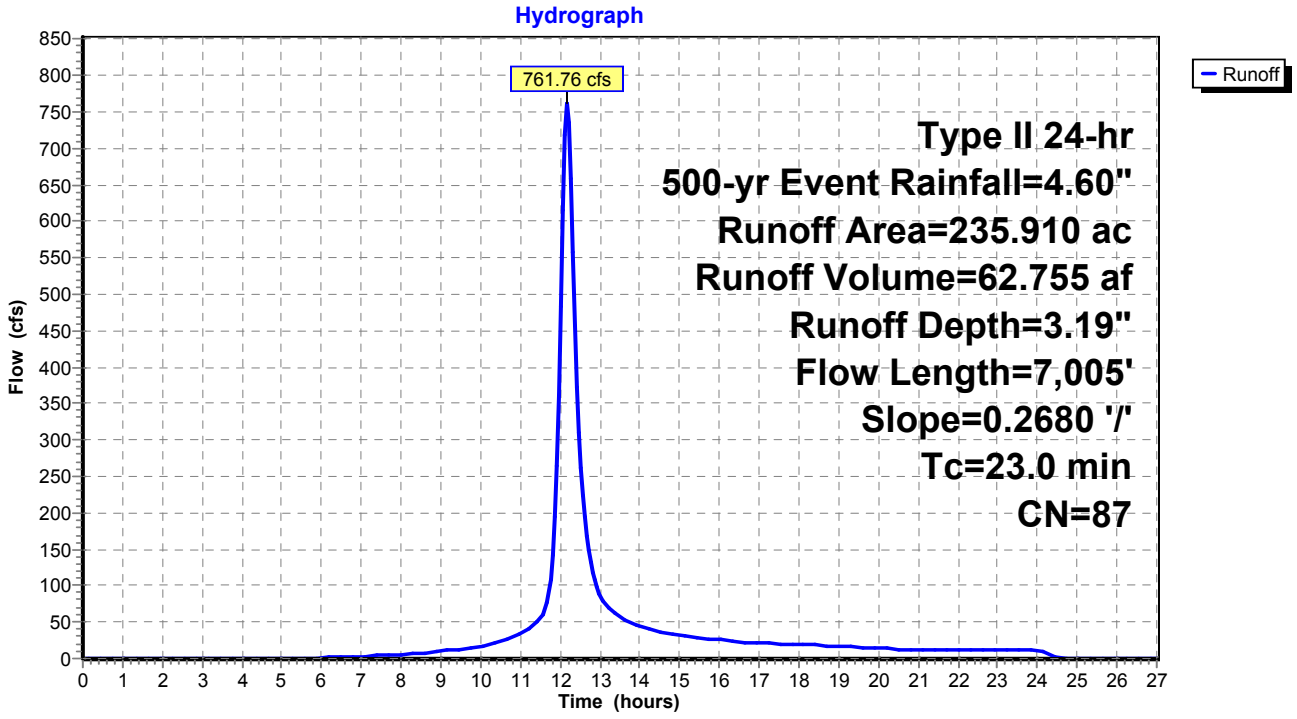
Runoff = 761.76 cfs @ 12.16 hrs, Volume= 62.755 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Summary for Subcatchment 10: WS 10

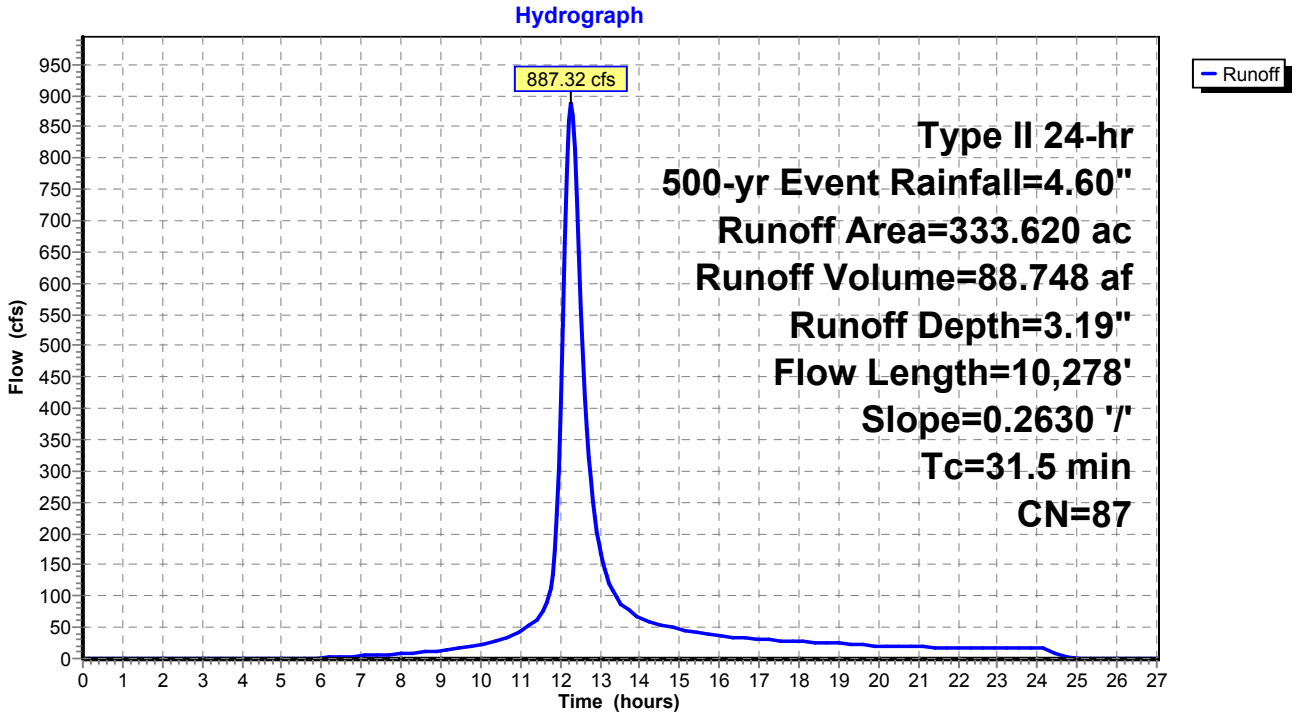
Runoff = 887.32 cfs @ 12.26 hrs, Volume= 88.748 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	300.260	86	Desert shrub range, Fair, HSG D
*	33.360	98	Impervious, HSG D
	333.620	87	Weighted Average
	300.260		90.00% Pervious Area
	33.360		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	10,278	0.2630	5.43		**Lag/CN Method,**

Subcatchment 10: WS 10



Existing Watersheds (Pre-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 11: WS 11

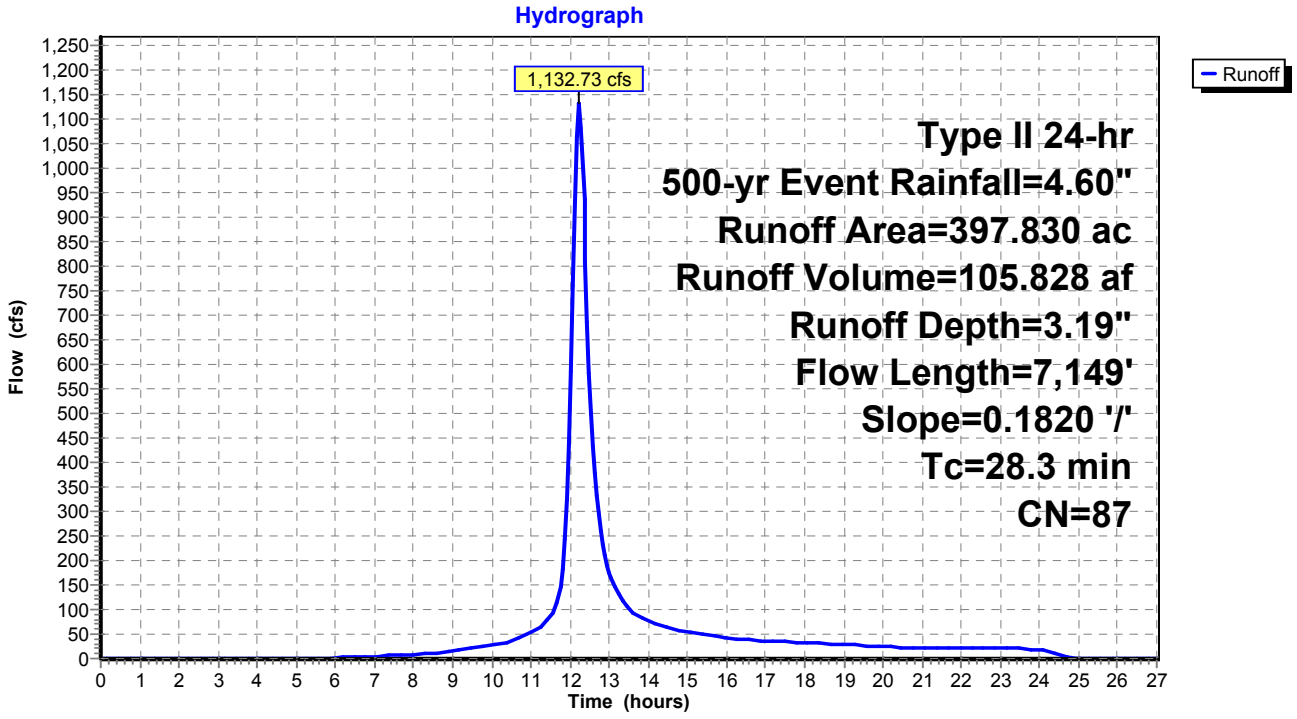
Runoff = 1,132.73 cfs @ 12.22 hrs, Volume= 105.828 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Existing Watersheds (Pre-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 12: WS 12

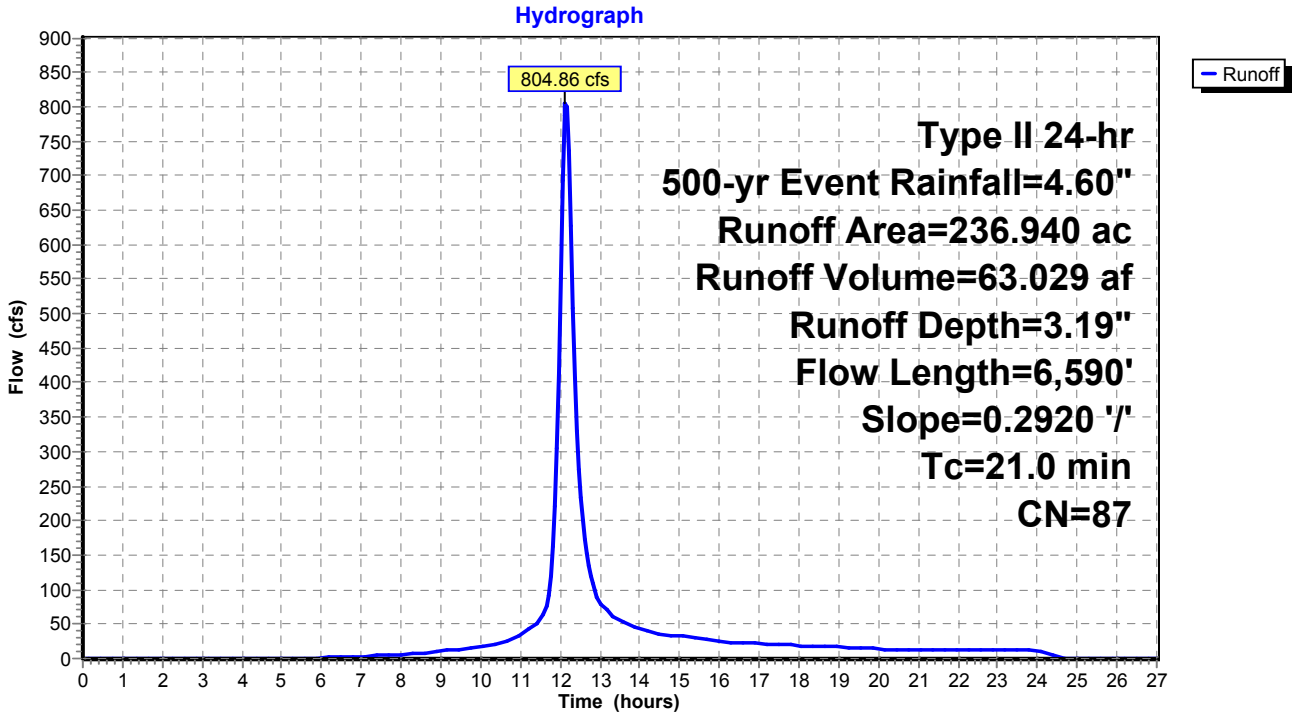
Runoff = 804.86 cfs @ 12.13 hrs, Volume= 63.029 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	213.250	86	Desert shrub range, Fair, HSG D
*	23.690	98	Impervious, HSG D
	236.940	87	Weighted Average
	213.250		90.00% Pervious Area
	23.690		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0	6,590	0.2920	5.24		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

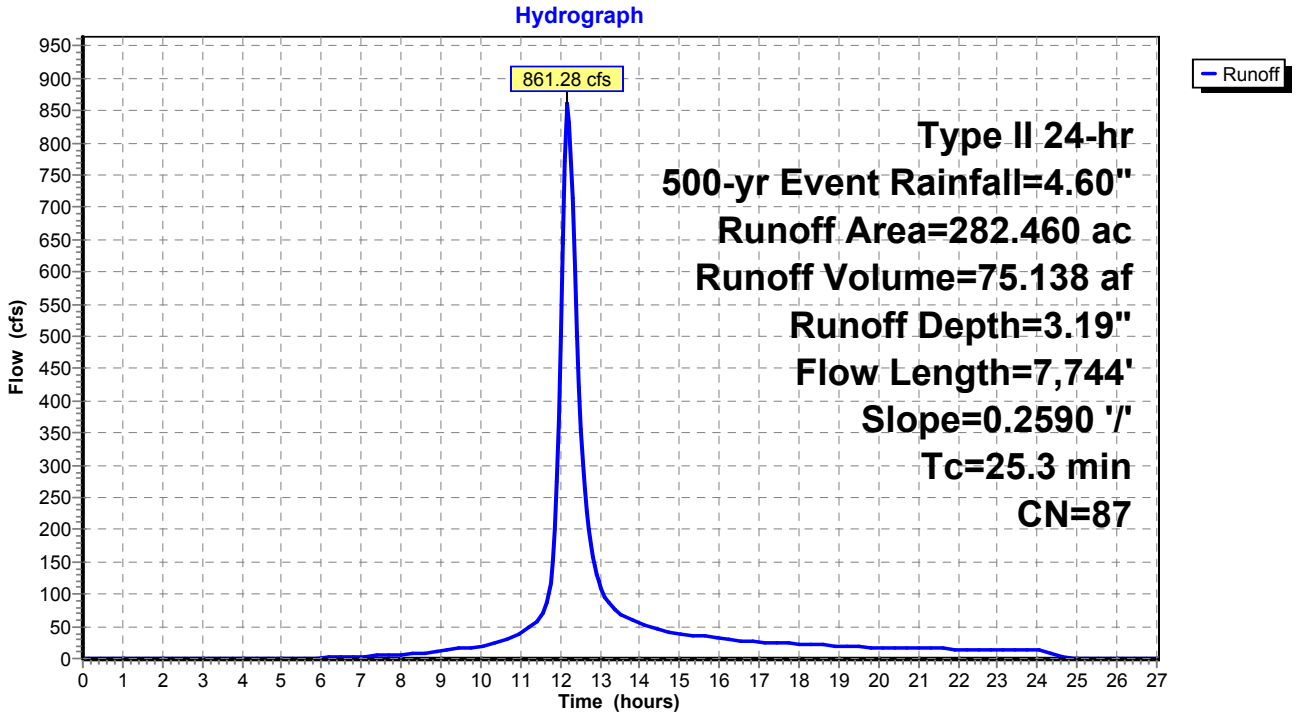
Runoff = 861.28 cfs @ 12.18 hrs, Volume= 75.138 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	254.210	86	Desert shrub range, Fair, HSG D
*	28.250	98	Impervious, HSG D
	282.460	87	Weighted Average
	254.210		90.00% Pervious Area
	28.250		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	7,744	0.2590	5.10		**Lag/CN Method,**

Subcatchment 13: WS 13



Existing Watersheds (Pre-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 14: WS 14

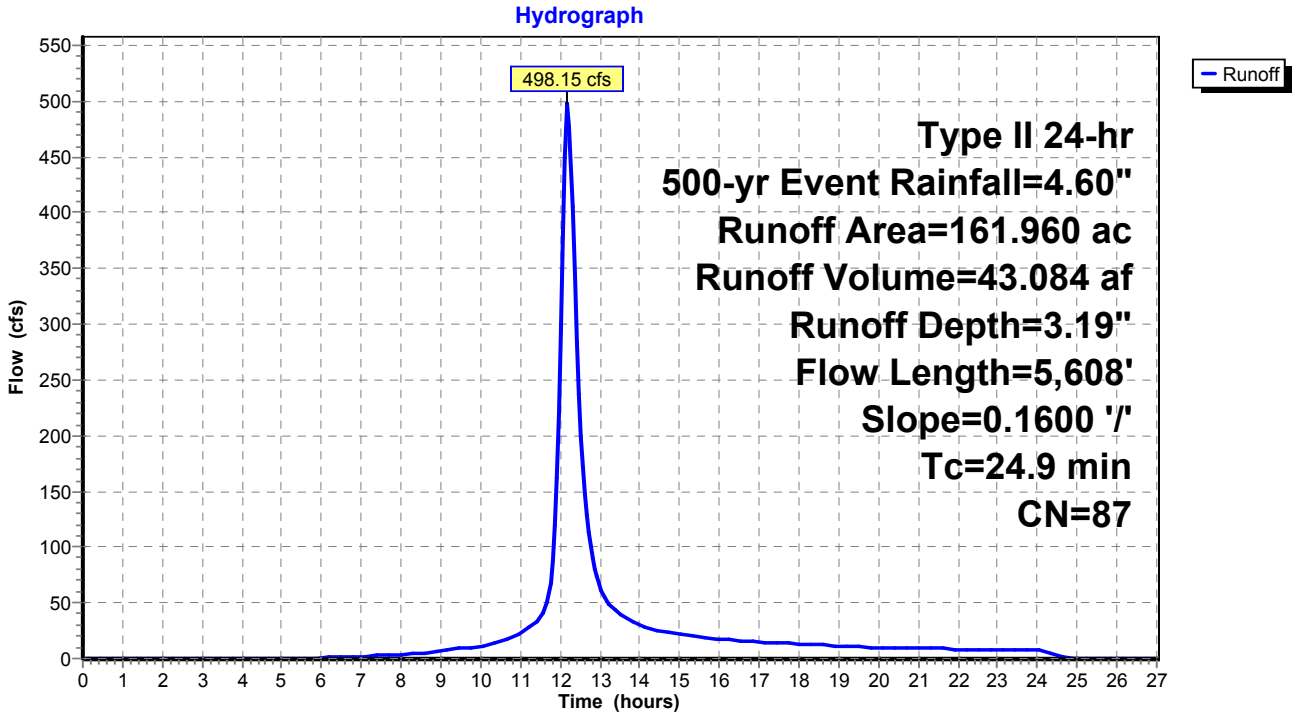
Runoff = 498.15 cfs @ 12.18 hrs, Volume= 43.084 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	145.760	86	Desert shrub range, Fair, HSG D
*	16.200	98	Impervious, HSG D
	161.960	87	Weighted Average
	145.760		90.00% Pervious Area
	16.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	5,608	0.1600	3.75		**Lag/CN Method,**

Subcatchment 14: WS 14



Existing Watersheds (Pre-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 15: WS 15

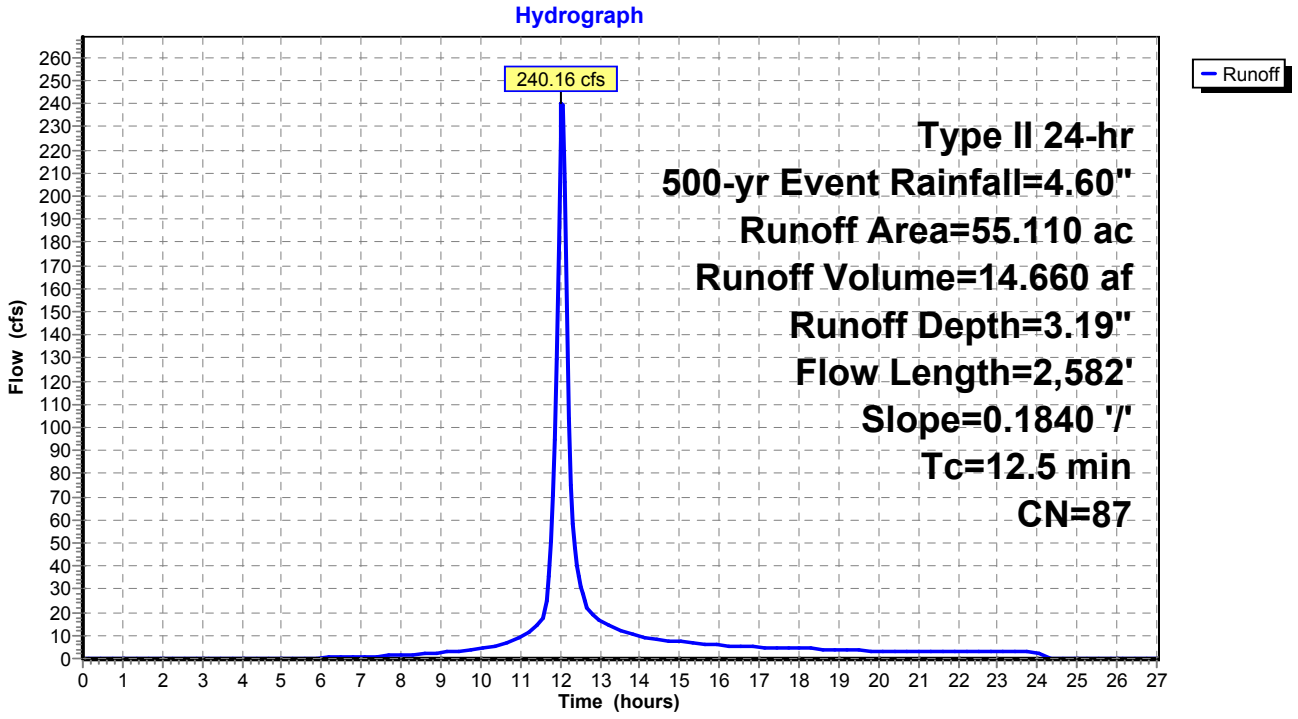
Runoff = 240.16 cfs @ 12.04 hrs, Volume= 14.660 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	49.600	86	Desert shrub range, Fair, HSG D
*	5.510	98	Impervious, HSG D
	55.110	87	Weighted Average
	49.600		90.00% Pervious Area
	5.510		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	2,582	0.1840	3.45		**Lag/CN Method,**

Subcatchment 15: WS 15



Summary for Subcatchment 16: WS 16

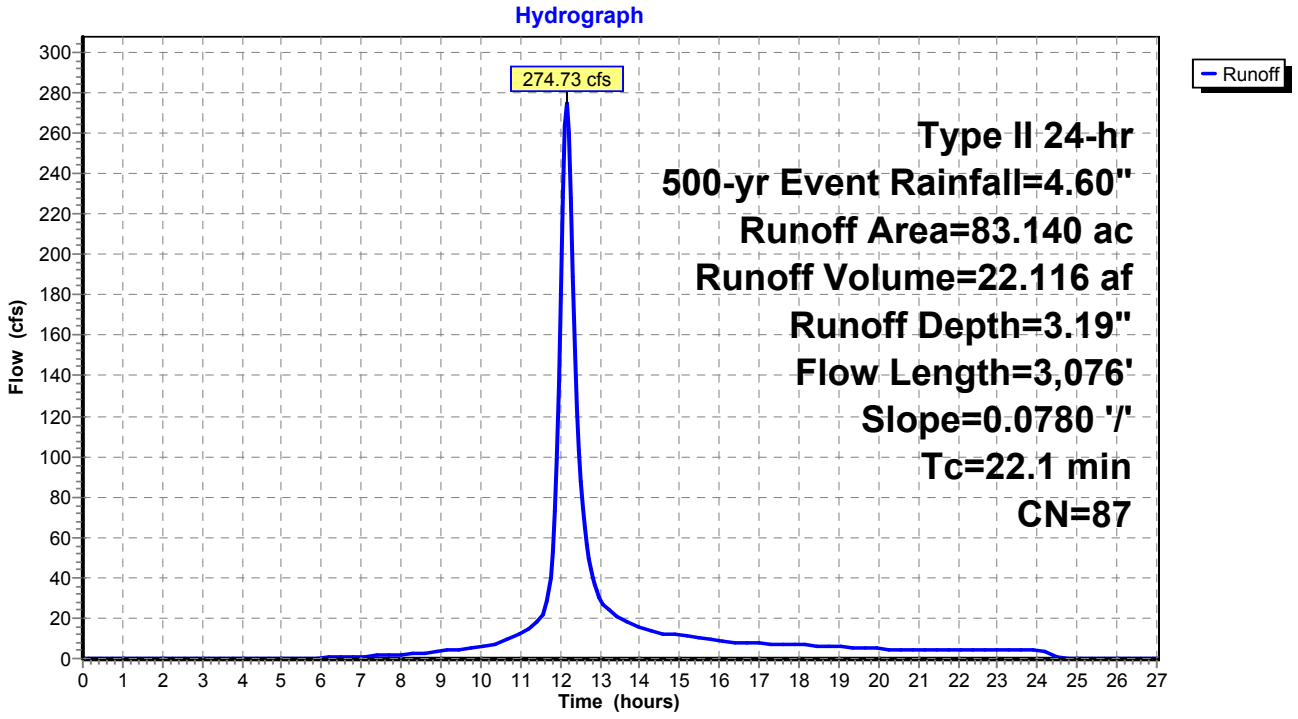
Runoff = 274.73 cfs @ 12.15 hrs, Volume= 22.116 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

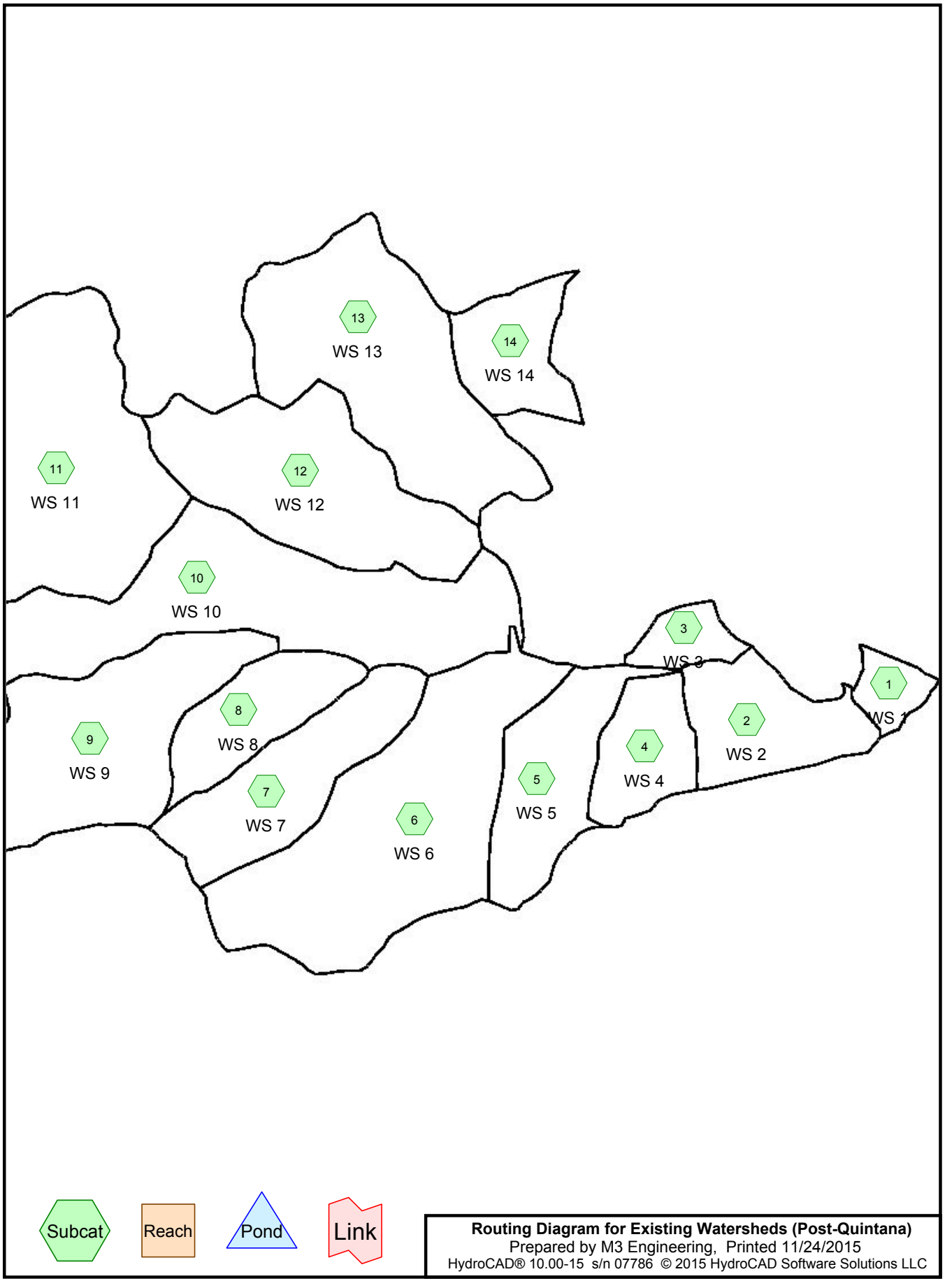
	Area (ac)	CN	Description
	74.830	86	Desert shrub range, Fair, HSG D
*	8.310	98	Impervious, HSG D
	83.140	87	Weighted Average
	74.830		90.00% Pervious Area
	8.310		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.1	3,076	0.0780	2.32		**Lag/CN Method,**

Subcatchment 16: WS 16



APPENDIX C



Routing Diagram for Existing Watersheds (Post-Quintana)
Prepared by M3 Engineering, Printed 11/24/2015

Existing Watersheds (Post-Quintana)
Prepared by M3 Engineering Printed 11/24/2015

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2,235.360	86	Desert shrub range, Fair, HSG D (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14)
248.370	98	Impervious, HSG D (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14)
2,483.730	**87**	**TOTAL AREA**

Existing Watersheds (Post-Quintana)
Prepared by M3 Engineering Printed 11/24/2015

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
2,483.730	HSG D	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
0.000	Other	
2,483.730		**TOTAL AREA**

Existing Watersheds (Post-Quintana)
Prepared by M3 Engineering Printed 11/24/2015

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	2,235.360	0.000	2,235.360	Desert shrub range, Fair	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
0.000	0.000	0.000	248.370	0.000	248.370	Impervious	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
0.000	**0.000**	**0.000**	**2,483.730**	**0.000**	**2,483.730**	**TOTAL AREA**	

Existing Watersheds (Post-Quintana) *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=28.210 ac 10.00% Impervious Runoff Depth=2.36"
Tc=5.0 min CN=87 Runoff=117.20 cfs 5.555 af

Subcatchment2: WS 2 Runoff Area=106.570 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,068' Slope=0.3140 '/' Tc=11.0 min CN=87 Runoff=363.66 cfs 20.985 af

Subcatchment3: WS 3 Runoff Area=34.990 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=1,603' Slope=0.1770 '/' Tc=8.7 min CN=87 Runoff=129.54 cfs 6.890 af

Subcatchment4: WS 4 Runoff Area=75.020 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,047' Slope=0.3390 '/' Tc=10.5 min CN=87 Runoff=259.92 cfs 14.773 af

Subcatchment5: WS 5 Runoff Area=124.190 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=5,976' Slope=0.3400 '/' Tc=18.0 min CN=87 Runoff=342.49 cfs 24.455 af

Subcatchment6: WS 6 Runoff Area=331.220 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=8,173' Slope=0.3100 '/' Tc=24.2 min CN=87 Runoff=774.13 cfs 65.223 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=5,064' Slope=0.2960 '/' Tc=16.9 min CN=87 Runoff=411.06 cfs 28.449 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=291.83 cfs 18.118 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=567.91 cfs 46.455 af

Subcatchment10: WS 10 Runoff Area=330.410 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=10,278' Slope=0.2760 '/' Tc=30.8 min CN=87 Runoff=663.73 cfs 65.063 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=843.39 cfs 78.339 af

Subcatchment12: WS 12 Runoff Area=227.420 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=6,590' Slope=0.3150 '/' Tc=20.2 min CN=87 Runoff=588.30 cfs 44.783 af

Subcatchment13: WS 13 Runoff Area=275.510 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,744' Slope=0.2930 '/' Tc=23.8 min CN=87 Runoff=649.87 cfs 54.252 af

Subcatchment14: WS 14 Runoff Area=79.970 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,545' Slope=0.2240 '/' Tc=14.6 min CN=87 Runoff=243.90 cfs 15.747 af

Total Runoff Area = 2,483.730 ac Runoff Volume = 489.087 af Average Runoff Depth = 2.36"
90.00% Pervious = 2,235.360 ac 10.00% Impervious = 248.370 ac

Summary for Subcatchment 1: WS 1

[49] Hint: Tc<2dt may require smaller dt

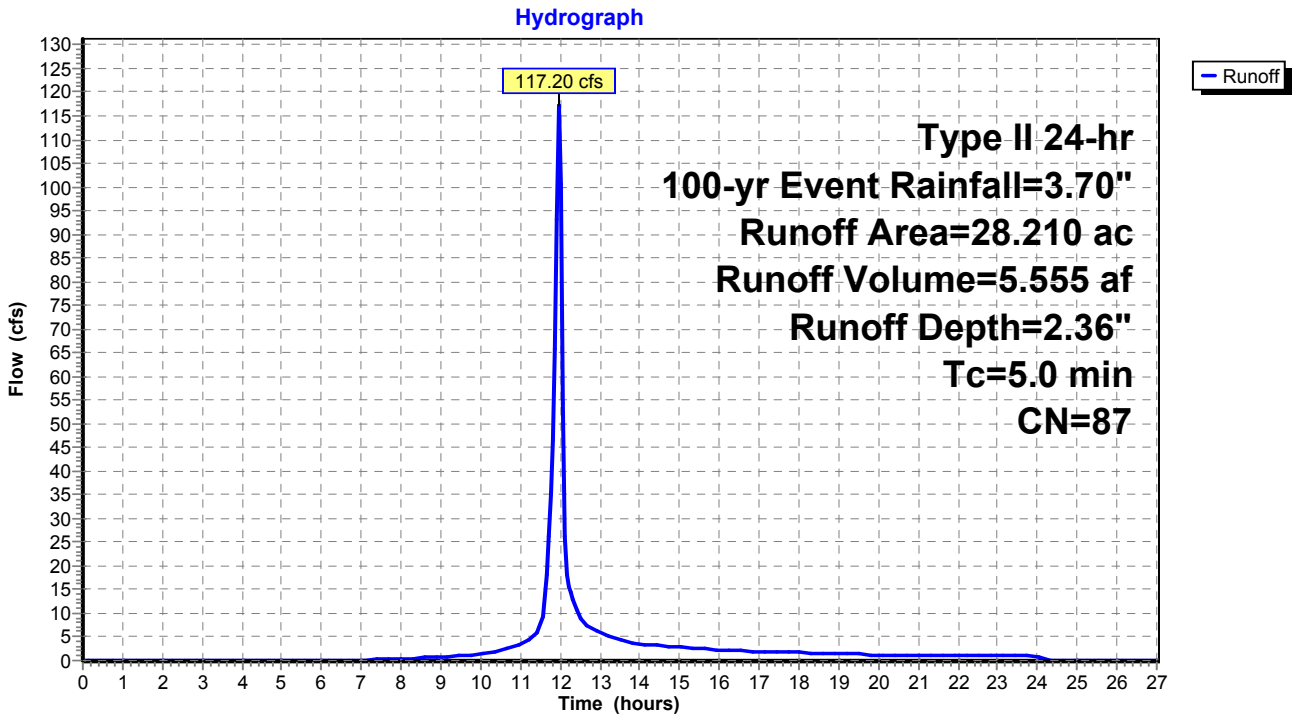
Runoff = 117.20 cfs @ 11.95 hrs, Volume= 5.555 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	25.390	86	Desert shrub range, Fair, HSG D
*	2.820	98	Impervious, HSG D
	28.210	87	Weighted Average
	25.390		90.00% Pervious Area
	2.820		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment 1: WS 1



Summary for Subcatchment 2: WS 2

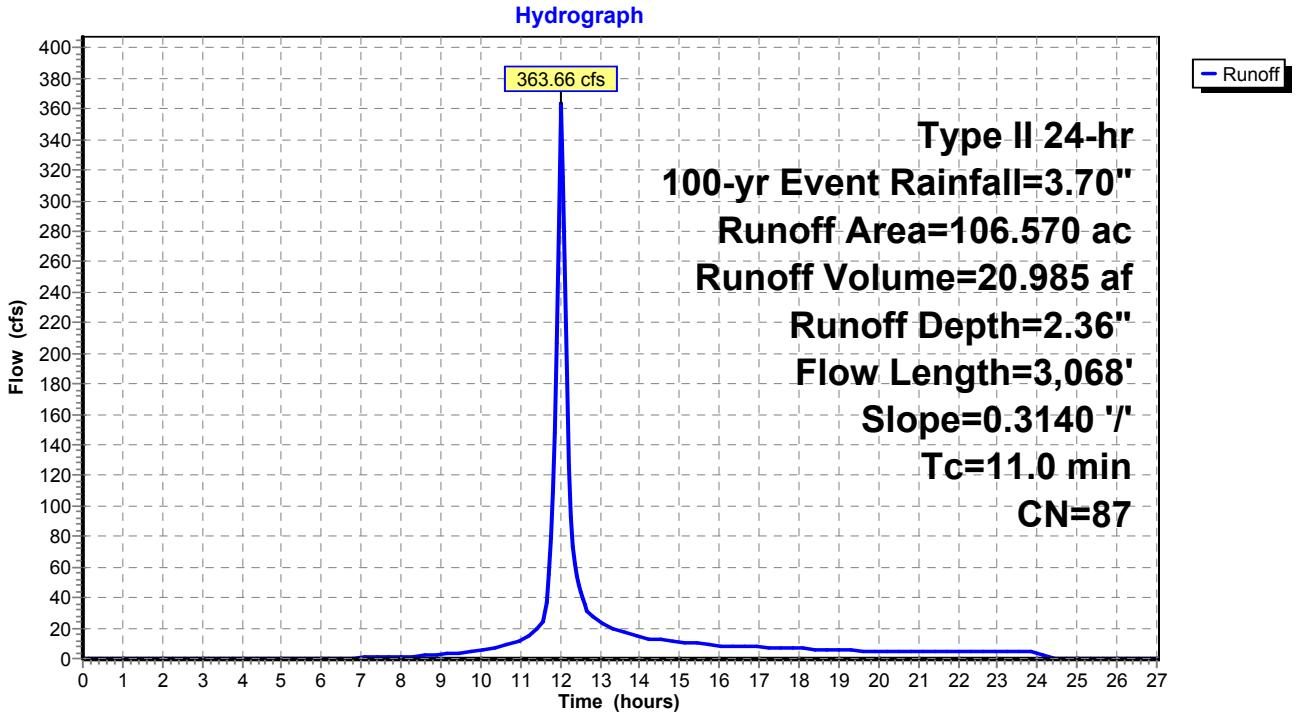
Runoff = 363.66 cfs @ 12.03 hrs, Volume= 20.985 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	95.910	86	Desert shrub range, Fair, HSG D
*	10.660	98	Impervious, HSG D
	106.570	87	Weighted Average
	95.910		90.00% Pervious Area
	10.660		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	3,068	0.3140	4.66		**Lag/CN Method,**

Subcatchment 2: WS 2



Existing Watersheds (Post-Quintana) *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 3: WS 3

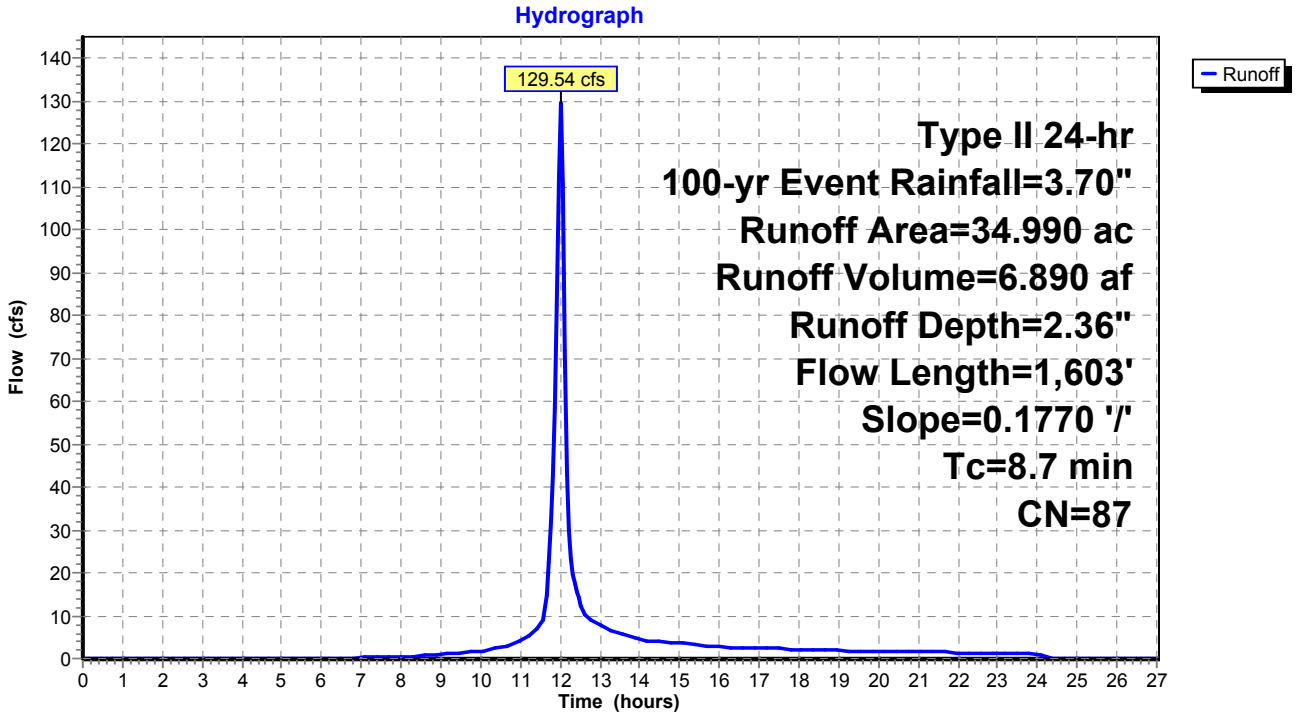
Runoff = 129.54 cfs @ 12.00 hrs, Volume= 6.890 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	31.490	86	Desert shrub range, Fair, HSG D
*	3.500	98	Impervious, HSG D
	34.990	87	Weighted Average
	31.490		90.00% Pervious Area
	3.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	1,603	0.1770	3.07		**Lag/CN Method,**

Subcatchment 3: WS 3



Summary for Subcatchment 4: WS 4

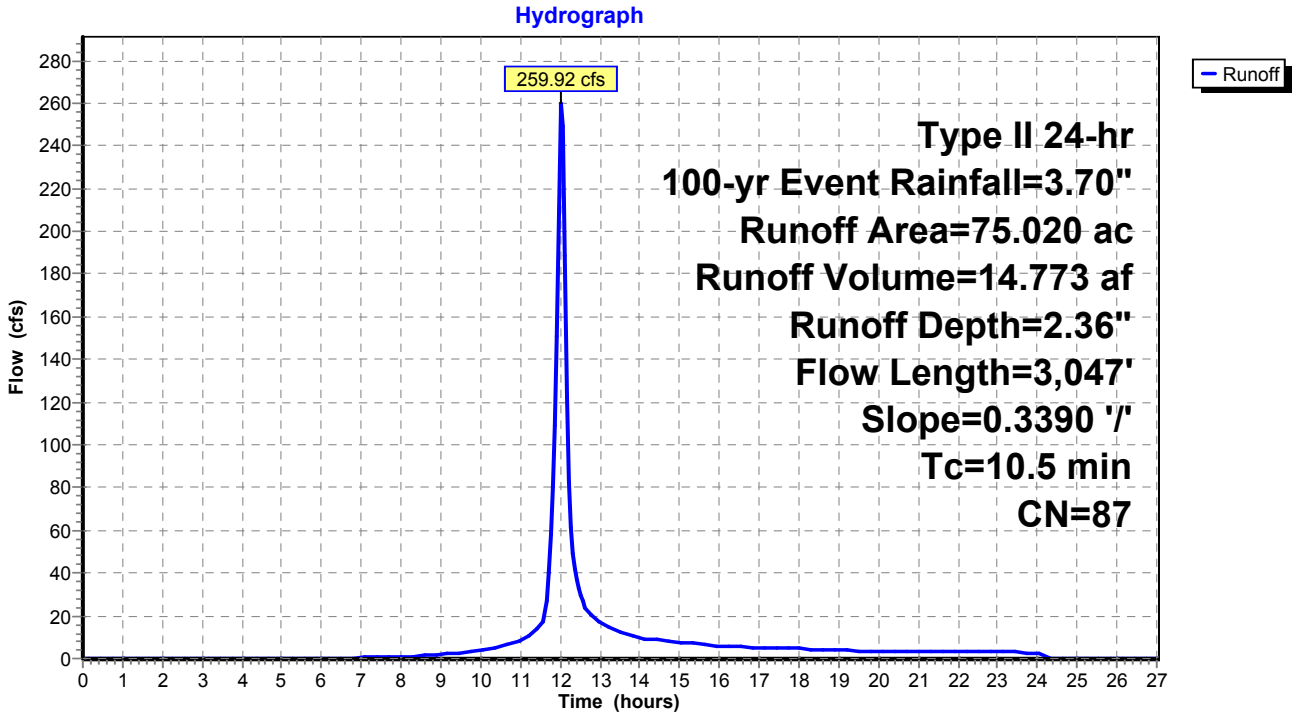
Runoff = 259.92 cfs @ 12.02 hrs, Volume= 14.773 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	67.520	86	Desert shrub range, Fair, HSG D
*	7.500	98	Impervious, HSG D
	75.020	87	Weighted Average
	67.520		90.00% Pervious Area
	7.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	3,047	0.3390	4.84		**Lag/CN Method,**

Subcatchment 4: WS 4



Summary for Subcatchment 5: WS 5

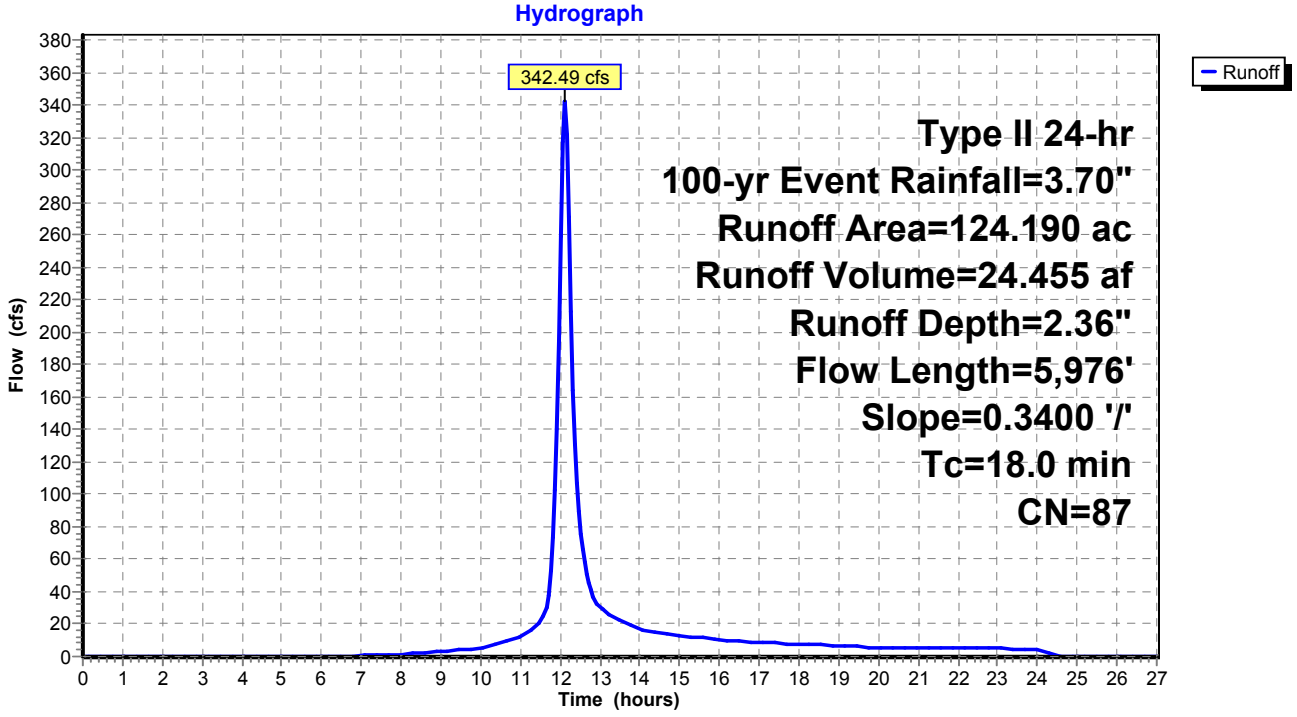
Runoff = 342.49 cfs @ 12.10 hrs, Volume= 24.455 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	111.770	86	Desert shrub range, Fair, HSG D
*	12.420	98	Impervious, HSG D
	124.190	87	Weighted Average
	111.770		90.00% Pervious Area
	12.420		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	5,976	0.3400	5.54		**Lag/CN Method,**

Subcatchment 5: WS 5



Summary for Subcatchment 6: WS 6

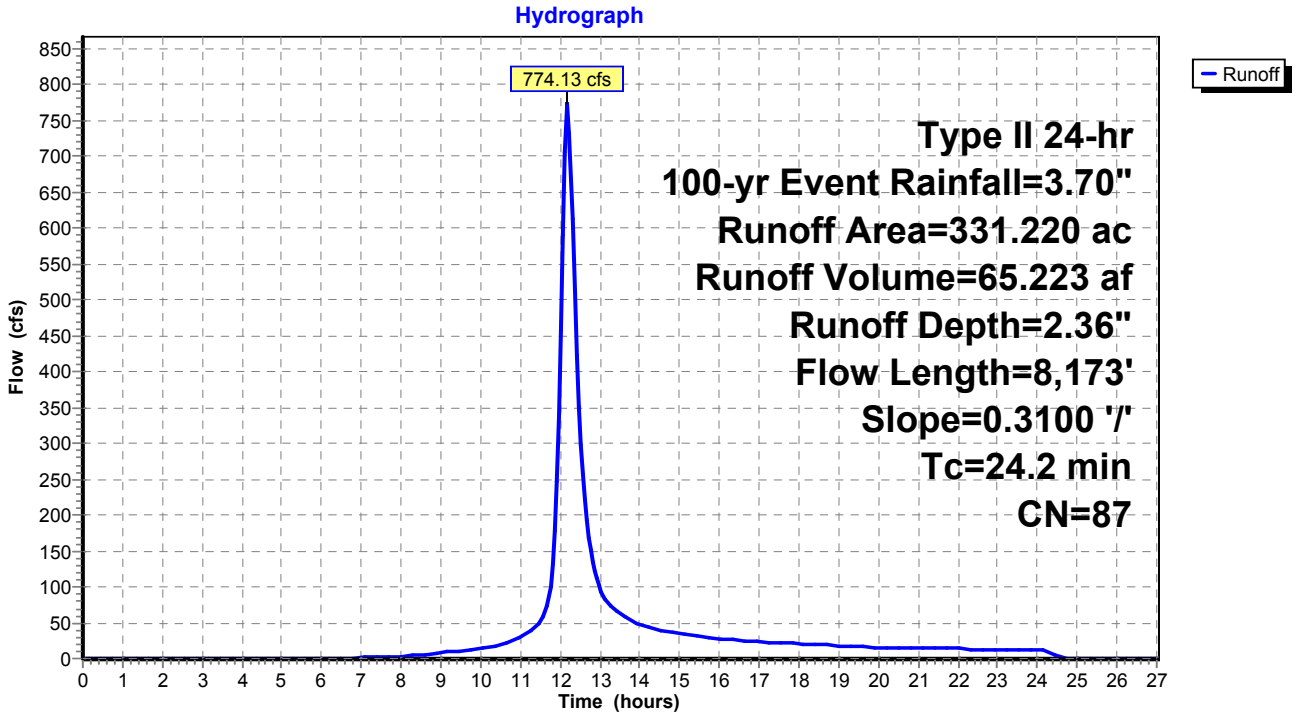
Runoff = 774.13 cfs @ 12.17 hrs, Volume= 65.223 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	298.100	86	Desert shrub range, Fair, HSG D
*	33.120	98	Impervious, HSG D
	331.220	87	Weighted Average
	298.100		90.00% Pervious Area
	33.120		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	8,173	0.3100	5.64		**Lag/CN Method,**

Subcatchment 6: WS 6



Summary for Subcatchment 7: WS 7

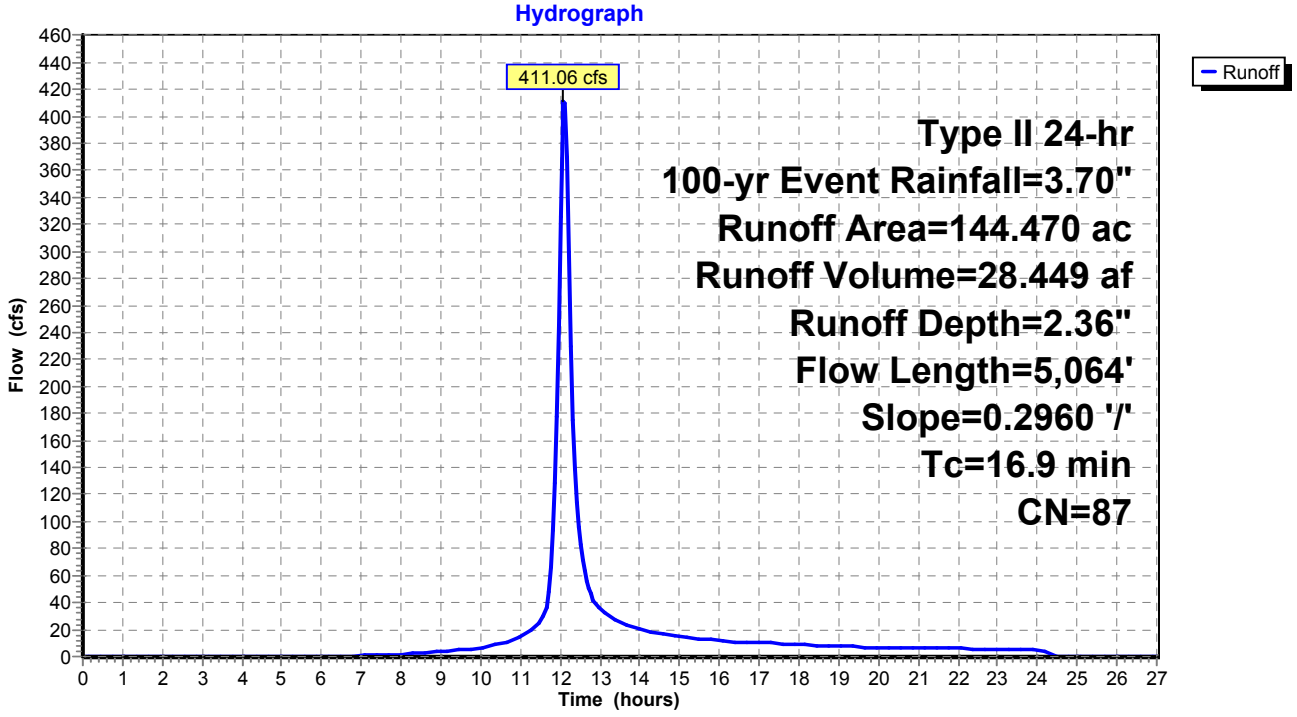
Runoff = 411.06 cfs @ 12.09 hrs, Volume= 28.449 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	5,064	0.2960	5.00		**Lag/CN Method,**

Subcatchment 7: WS 7



Summary for Subcatchment 8: WS 8

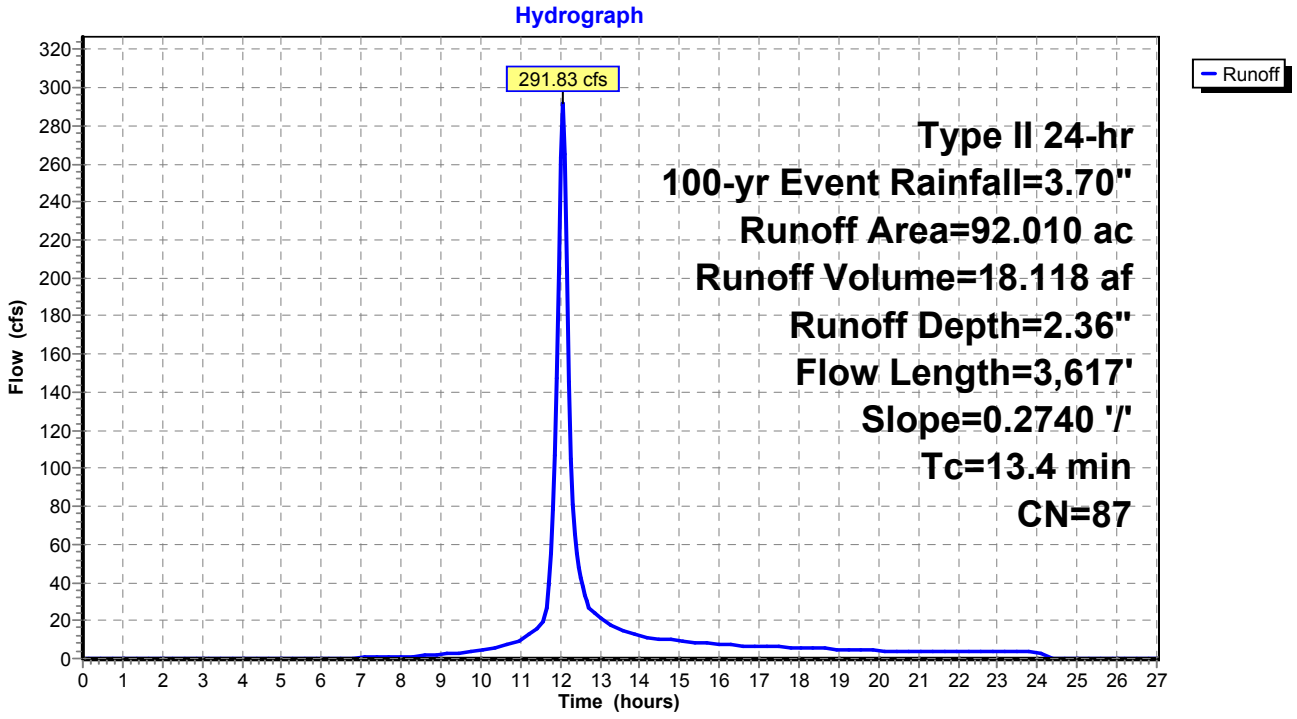
Runoff = 291.83 cfs @ 12.05 hrs, Volume= 18.118 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

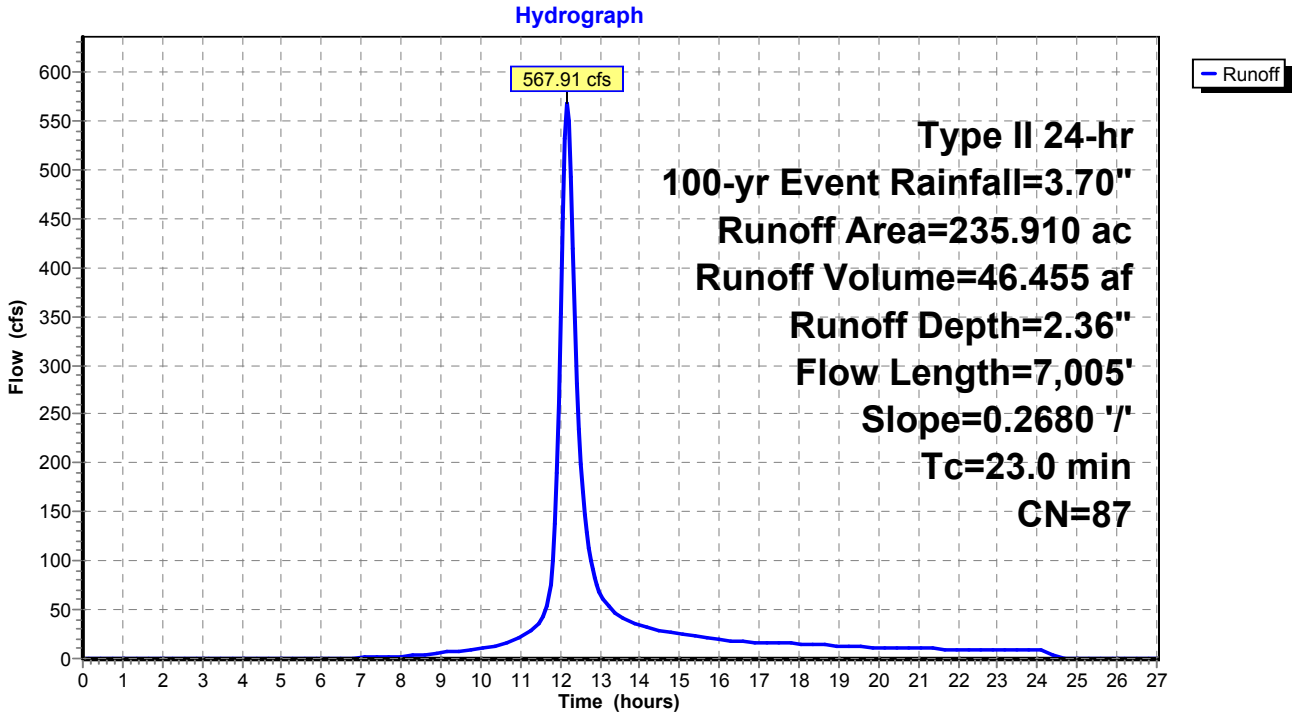
Runoff = 567.91 cfs @ 12.16 hrs, Volume= 46.455 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Summary for Subcatchment 10: WS 10

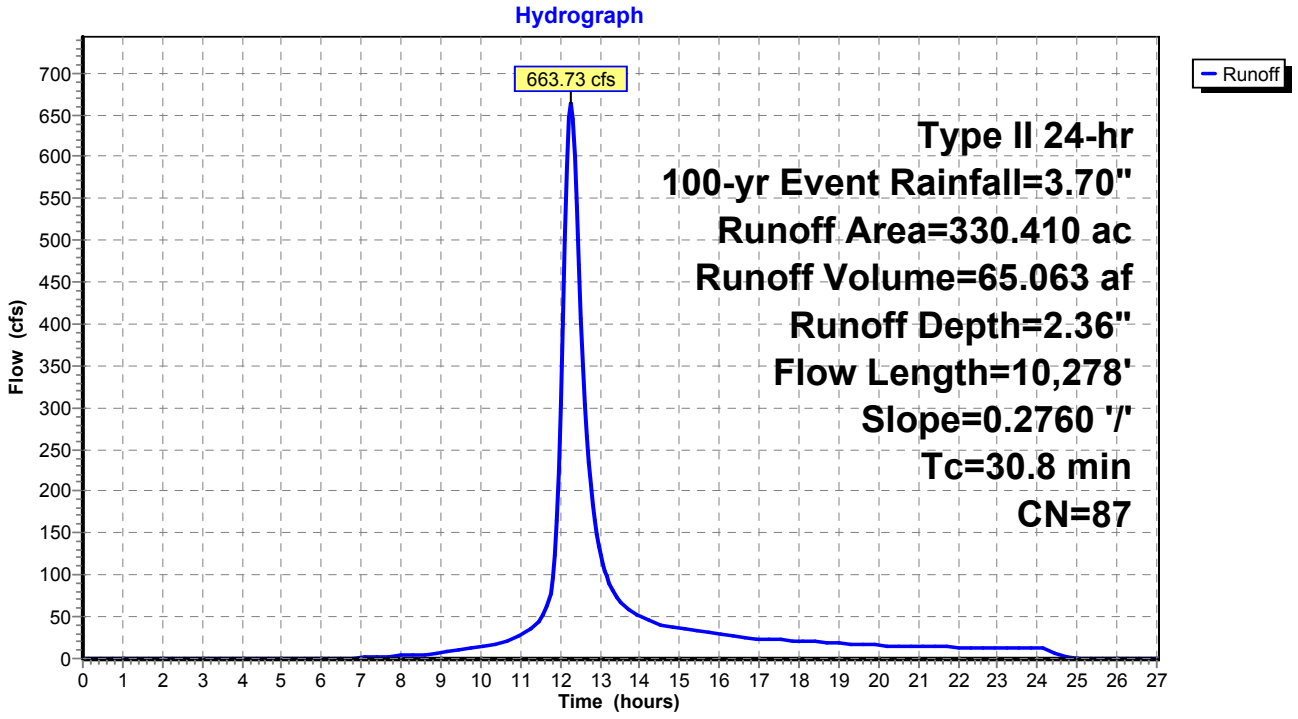
Runoff = 663.73 cfs @ 12.25 hrs, Volume= 65.063 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	297.370	86	Desert shrub range, Fair, HSG D
*	33.040	98	Impervious, HSG D
	330.410	87	Weighted Average
	297.370		90.00% Pervious Area
	33.040		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	10,278	0.2760	5.57		**Lag/CN Method,**

Subcatchment 10: WS 10



Summary for Subcatchment 11: WS 11

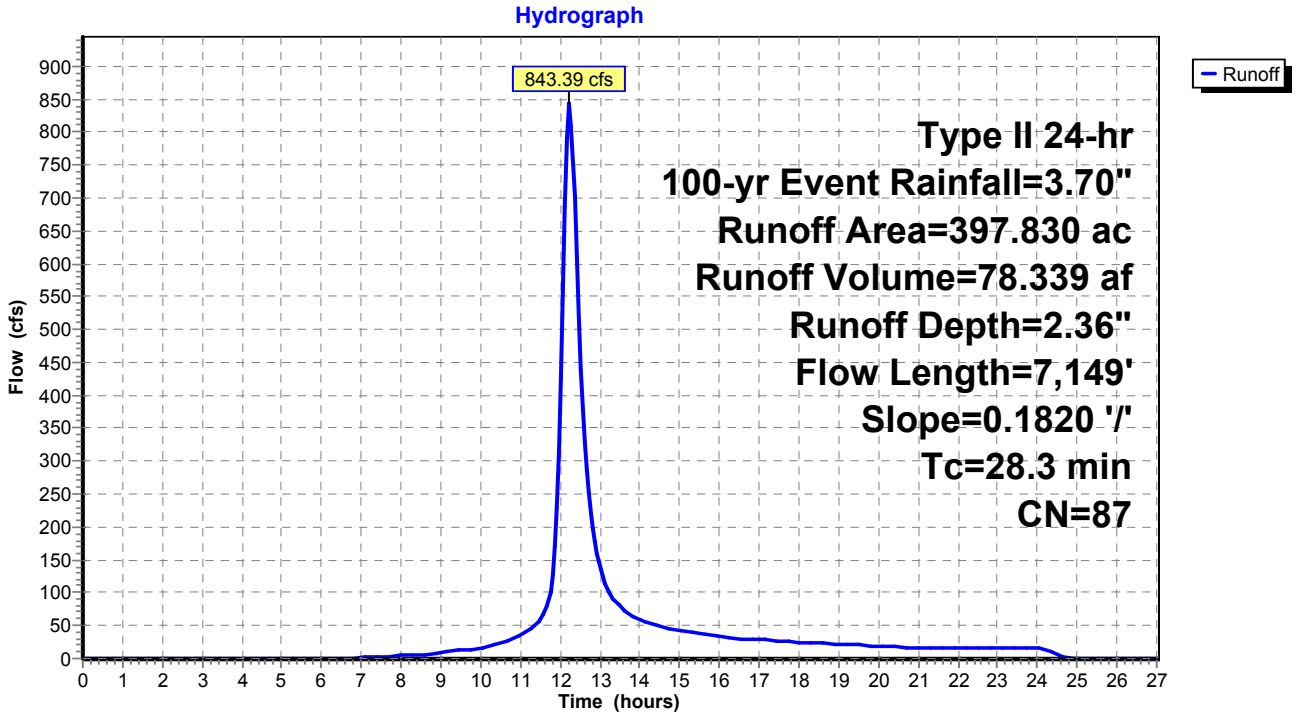
Runoff = 843.39 cfs @ 12.22 hrs, Volume= 78.339 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Summary for Subcatchment 12: WS 12

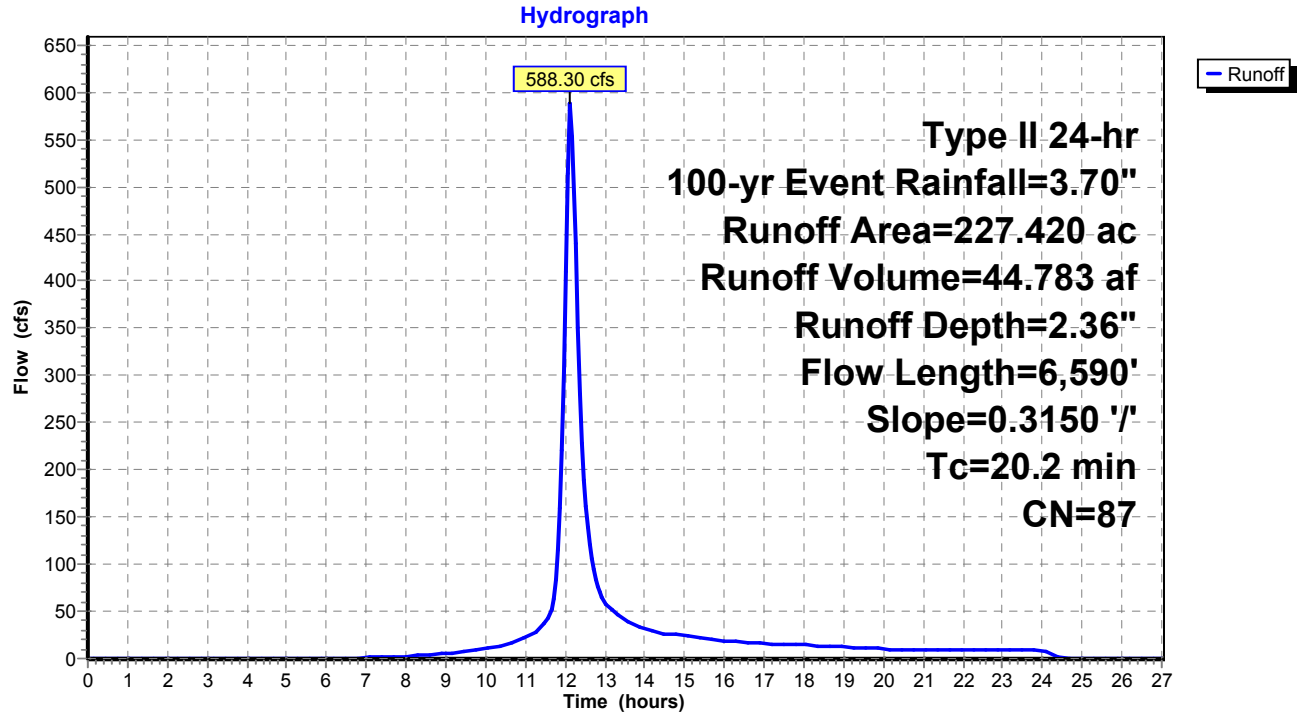
Runoff = 588.30 cfs @ 12.13 hrs, Volume= 44.783 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	204.680	86	Desert shrub range, Fair, HSG D
*	22.740	98	Impervious, HSG D
	227.420	87	Weighted Average
	204.680		90.00% Pervious Area
	22.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	6,590	0.3150	5.44		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

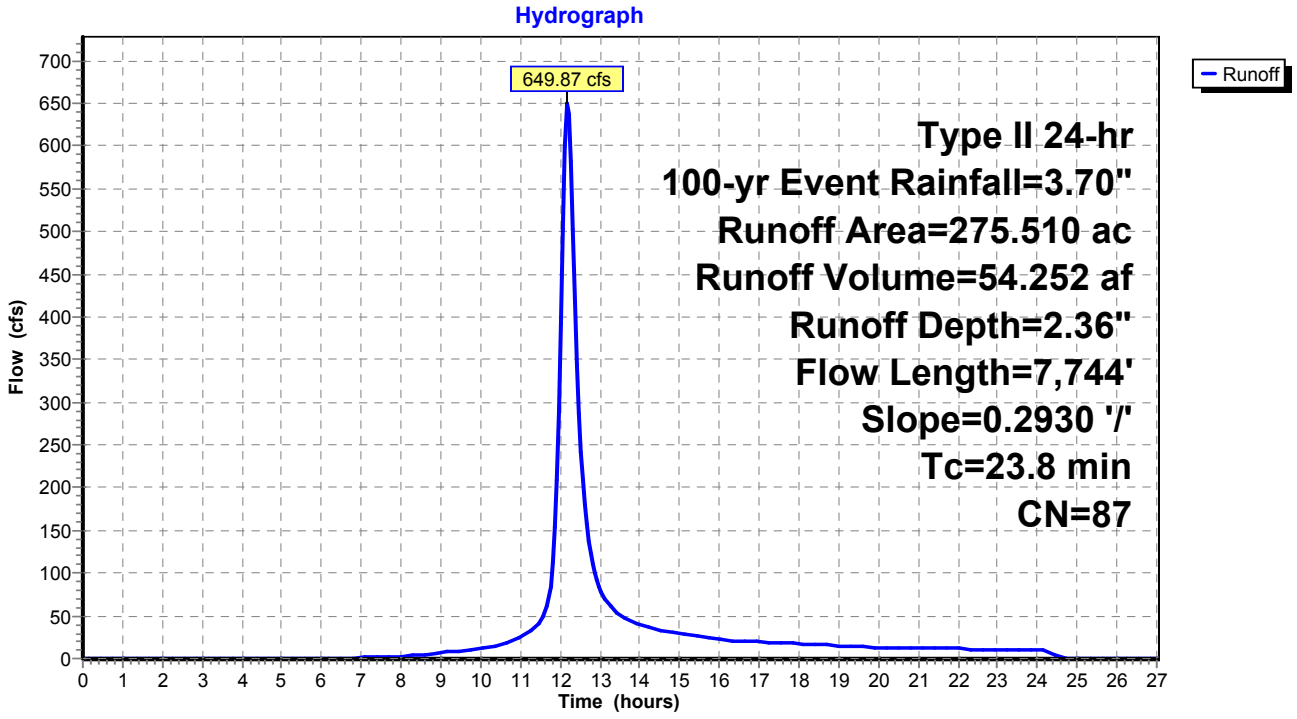
Runoff = 649.87 cfs @ 12.17 hrs, Volume= 54.252 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	247.960	86	Desert shrub range, Fair, HSG D
*	27.550	98	Impervious, HSG D
	275.510	87	Weighted Average
	247.960		90.00% Pervious Area
	27.550		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	7,744	0.2930	5.42		**Lag/CN Method,**

Subcatchment 13: WS 13



Existing Watersheds (Post-Quintana) *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 14: WS 14

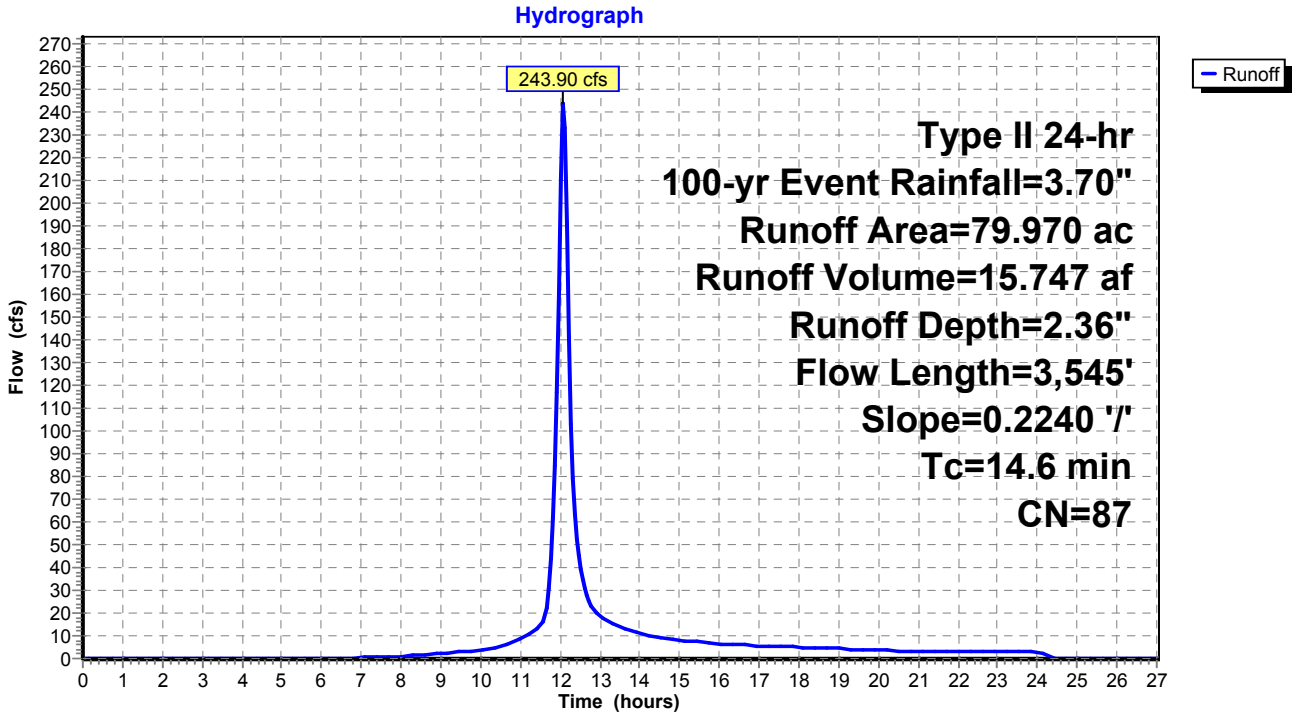
Runoff = 243.90 cfs @ 12.06 hrs, Volume= 15.747 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	71.970	86	Desert shrub range, Fair, HSG D
*	8.000	98	Impervious, HSG D
	79.970	87	Weighted Average
	71.970		90.00% Pervious Area
	8.000		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	3,545	0.2240	4.05		**Lag/CN Method,**

Subcatchment 14: WS 14



Existing Watersheds (Post-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=28.210 ac 10.00% Impervious Runoff Depth=2.72"
Tc=5.0 min CN=87 Runoff=133.97 cfs 6.393 af

Subcatchment2: WS 2 Runoff Area=106.570 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,068' Slope=0.3140 '/' Tc=11.0 min CN=87 Runoff=415.35 cfs 24.150 af

Subcatchment3: WS 3 Runoff Area=34.990 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=1,603' Slope=0.1770 '/' Tc=8.7 min CN=87 Runoff=148.20 cfs 7.929 af

Subcatchment4: WS 4 Runoff Area=75.020 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,047' Slope=0.3390 '/' Tc=10.5 min CN=87 Runoff=297.56 cfs 17.000 af

Subcatchment5: WS 5 Runoff Area=124.190 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=5,976' Slope=0.3400 '/' Tc=18.0 min CN=87 Runoff=392.70 cfs 28.143 af

Subcatchment6: WS 6 Runoff Area=331.220 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=8,173' Slope=0.3100 '/' Tc=24.2 min CN=87 Runoff=888.50 cfs 75.058 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=5,064' Slope=0.2960 '/' Tc=16.9 min CN=87 Runoff=471.20 cfs 32.739 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=334.29 cfs 20.851 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=651.70 cfs 53.460 af

Subcatchment10: WS 10 Runoff Area=330.410 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=10,278' Slope=0.2760 '/' Tc=30.8 min CN=87 Runoff=762.30 cfs 74.875 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=968.42 cfs 90.153 af

Subcatchment12: WS 12 Runoff Area=227.420 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=6,590' Slope=0.3150 '/' Tc=20.2 min CN=87 Runoff=674.80 cfs 51.536 af

Subcatchment13: WS 13 Runoff Area=275.510 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,744' Slope=0.2930 '/' Tc=23.8 min CN=87 Runoff=745.85 cfs 62.434 af

Subcatchment14: WS 14 Runoff Area=79.970 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,545' Slope=0.2240 '/' Tc=14.6 min CN=87 Runoff=279.49 cfs 18.122 af

Total Runoff Area = 2,483.730 ac Runoff Volume = 562.843 af Average Runoff Depth = 2.72"
90.00% Pervious = 2,235.360 ac 10.00% Impervious = 248.370 ac

Existing Watersheds (Post-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 1: WS 1

[49] Hint: Tc<2dt may require smaller dt

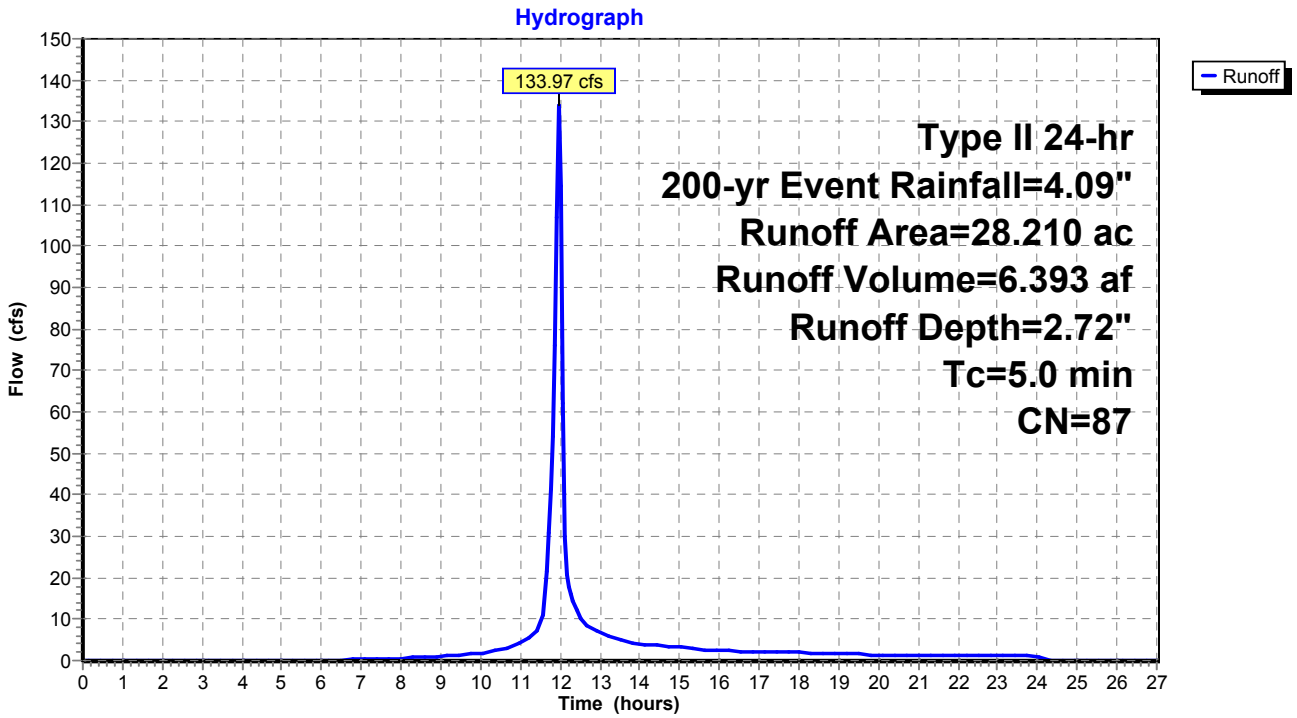
Runoff = 133.97 cfs @ 11.95 hrs, Volume= 6.393 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	25.390	86	Desert shrub range, Fair, HSG D
*	2.820	98	Impervious, HSG D
	28.210	87	Weighted Average
	25.390		90.00% Pervious Area
	2.820		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment 1: WS 1



Summary for Subcatchment 2: WS 2

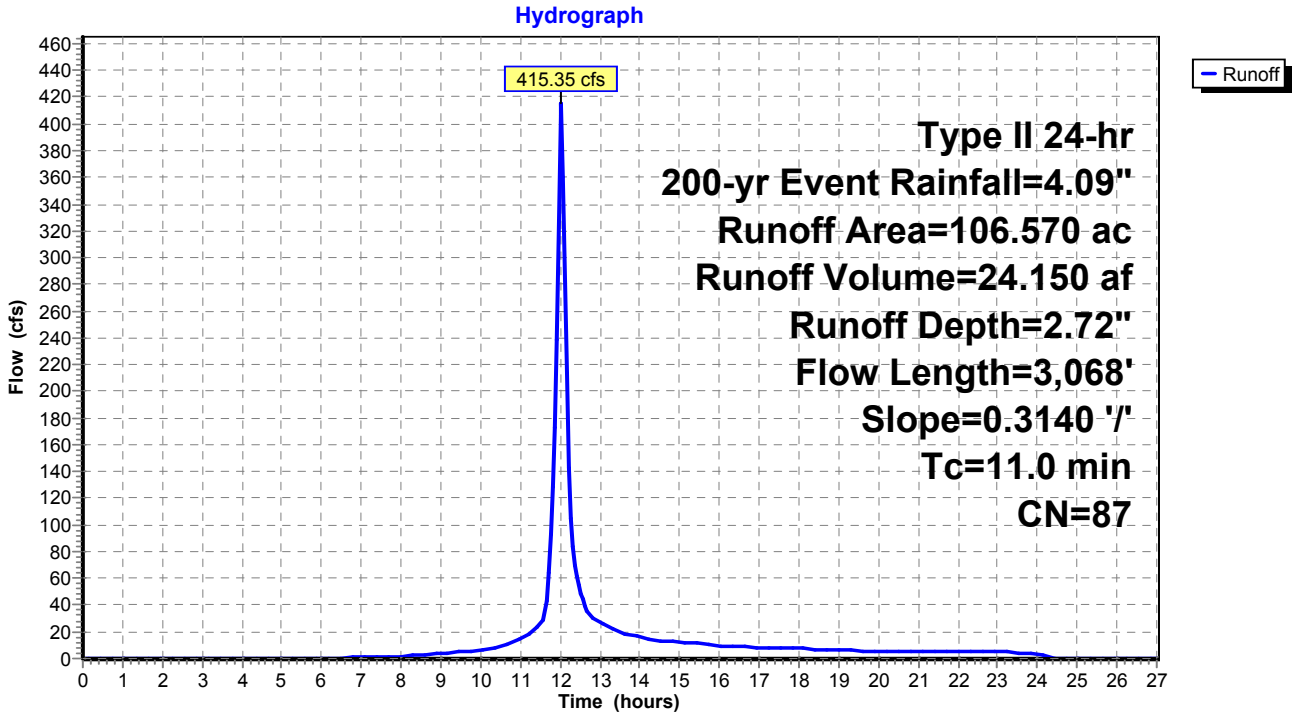
Runoff = 415.35 cfs @ 12.02 hrs, Volume= 24.150 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	95.910	86	Desert shrub range, Fair, HSG D
*	10.660	98	Impervious, HSG D
	106.570	87	Weighted Average
	95.910		90.00% Pervious Area
	10.660		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	3,068	0.3140	4.66		**Lag/CN Method,**

Subcatchment 2: WS 2



Summary for Subcatchment 3: WS 3

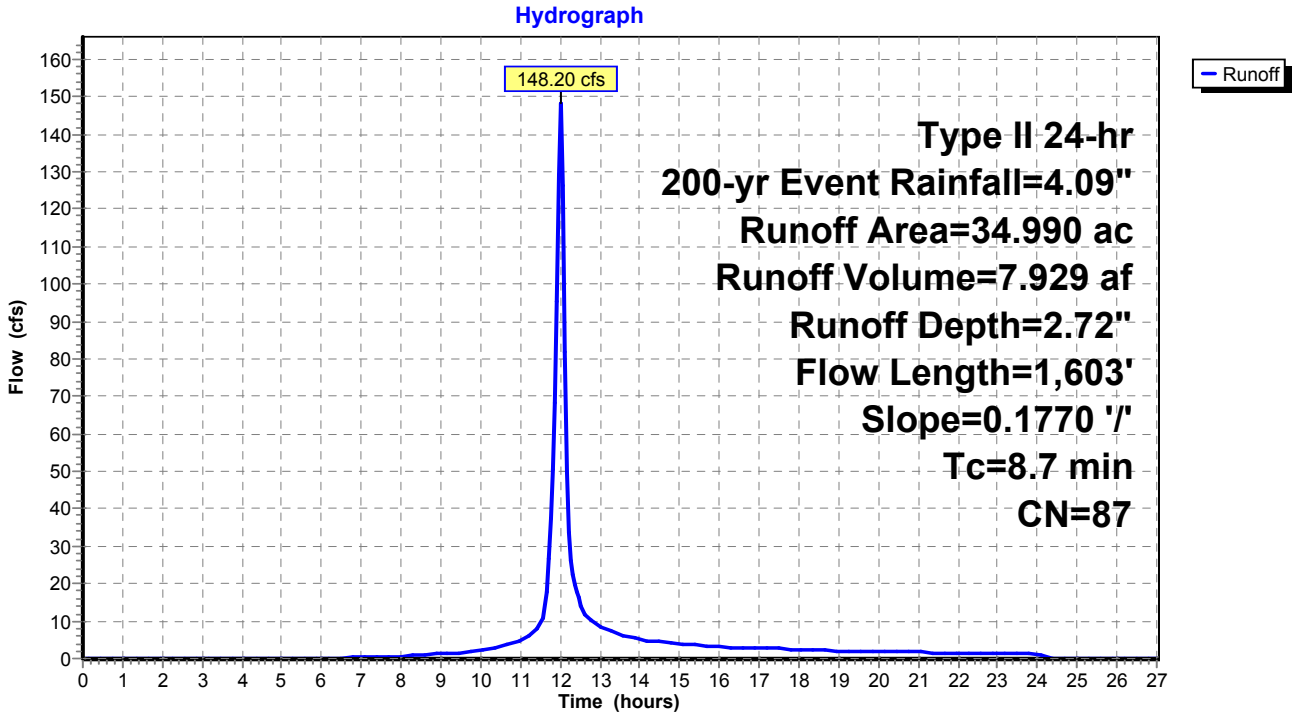
Runoff = 148.20 cfs @ 12.00 hrs, Volume= 7.929 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	31.490	86	Desert shrub range, Fair, HSG D
*	3.500	98	Impervious, HSG D
	34.990	87	Weighted Average
	31.490		90.00% Pervious Area
	3.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	1,603	0.1770	3.07		**Lag/CN Method,**

Subcatchment 3: WS 3



Existing Watersheds (Post-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 4: WS 4

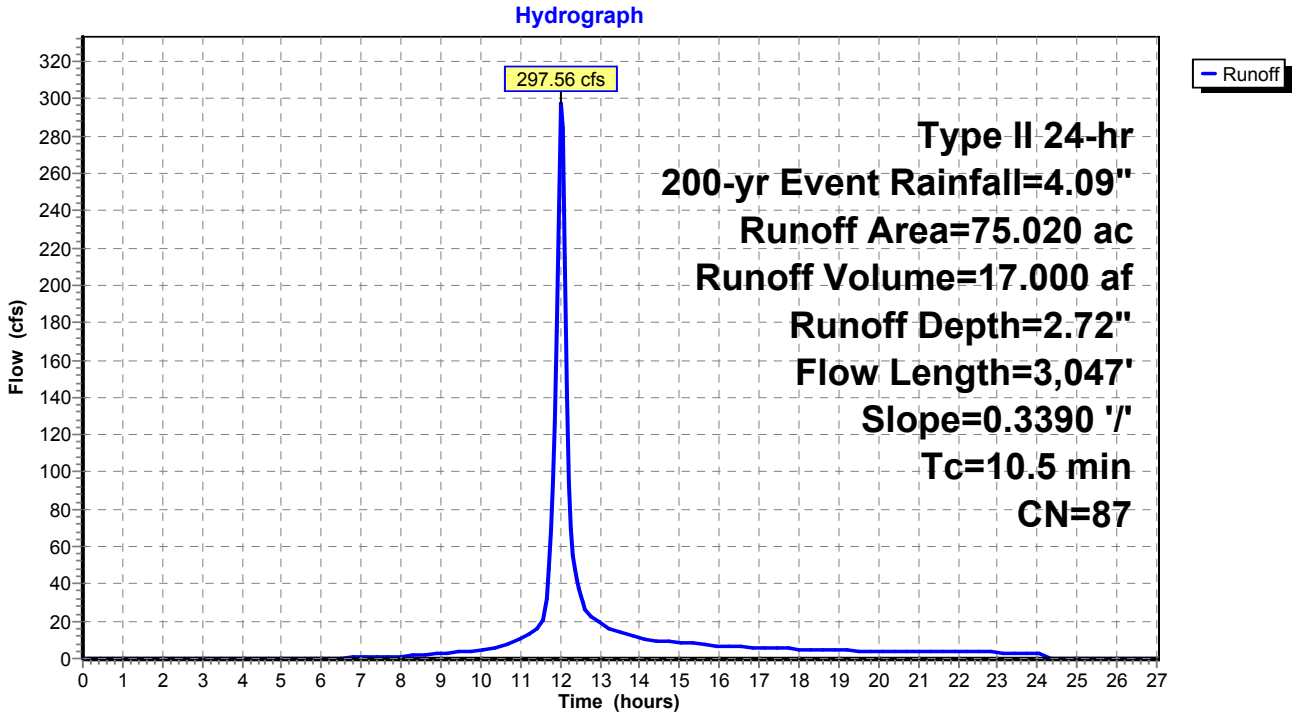
Runoff = 297.56 cfs @ 12.02 hrs, Volume= 17.000 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	67.520	86	Desert shrub range, Fair, HSG D
*	7.500	98	Impervious, HSG D
	75.020	87	Weighted Average
	67.520		90.00% Pervious Area
	7.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	3,047	0.3390	4.84		**Lag/CN Method,**

Subcatchment 4: WS 4



Summary for Subcatchment 5: WS 5

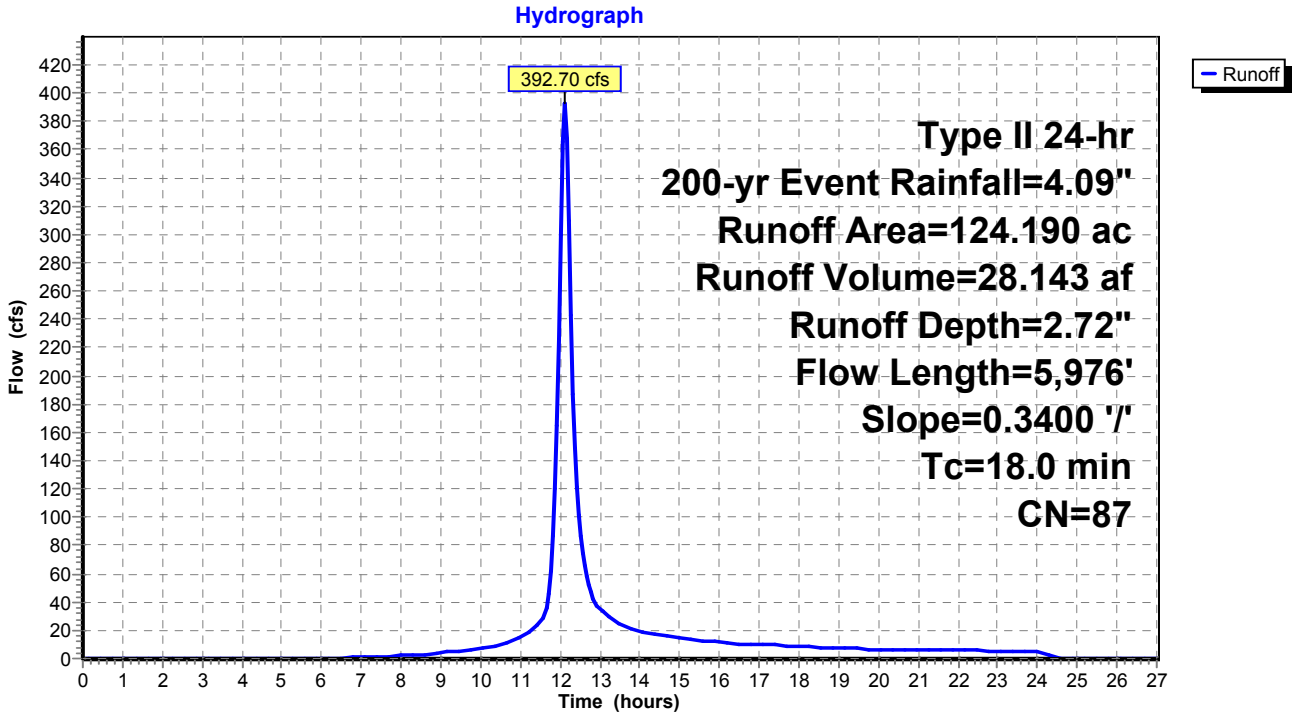
Runoff = 392.70 cfs @ 12.10 hrs, Volume= 28.143 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	111.770	86	Desert shrub range, Fair, HSG D
*	12.420	98	Impervious, HSG D
	124.190	87	Weighted Average
	111.770		90.00% Pervious Area
	12.420		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	5,976	0.3400	5.54		**Lag/CN Method,**

Subcatchment 5: WS 5



Summary for Subcatchment 6: WS 6

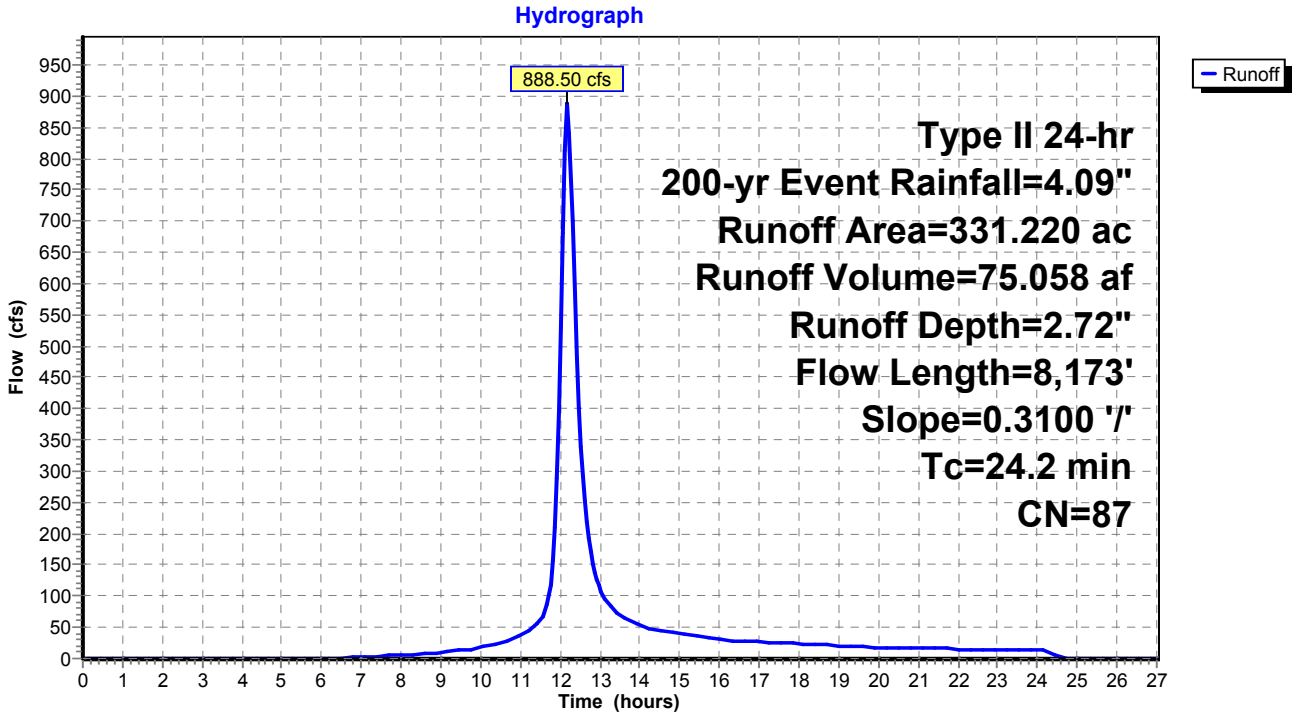
Runoff = 888.50 cfs @ 12.17 hrs, Volume= 75.058 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	298.100	86	Desert shrub range, Fair, HSG D
*	33.120	98	Impervious, HSG D
	331.220	87	Weighted Average
	298.100		90.00% Pervious Area
	33.120		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	8,173	0.3100	5.64		**Lag/CN Method,**

Subcatchment 6: WS 6



Existing Watersheds (Post-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 7: WS 7

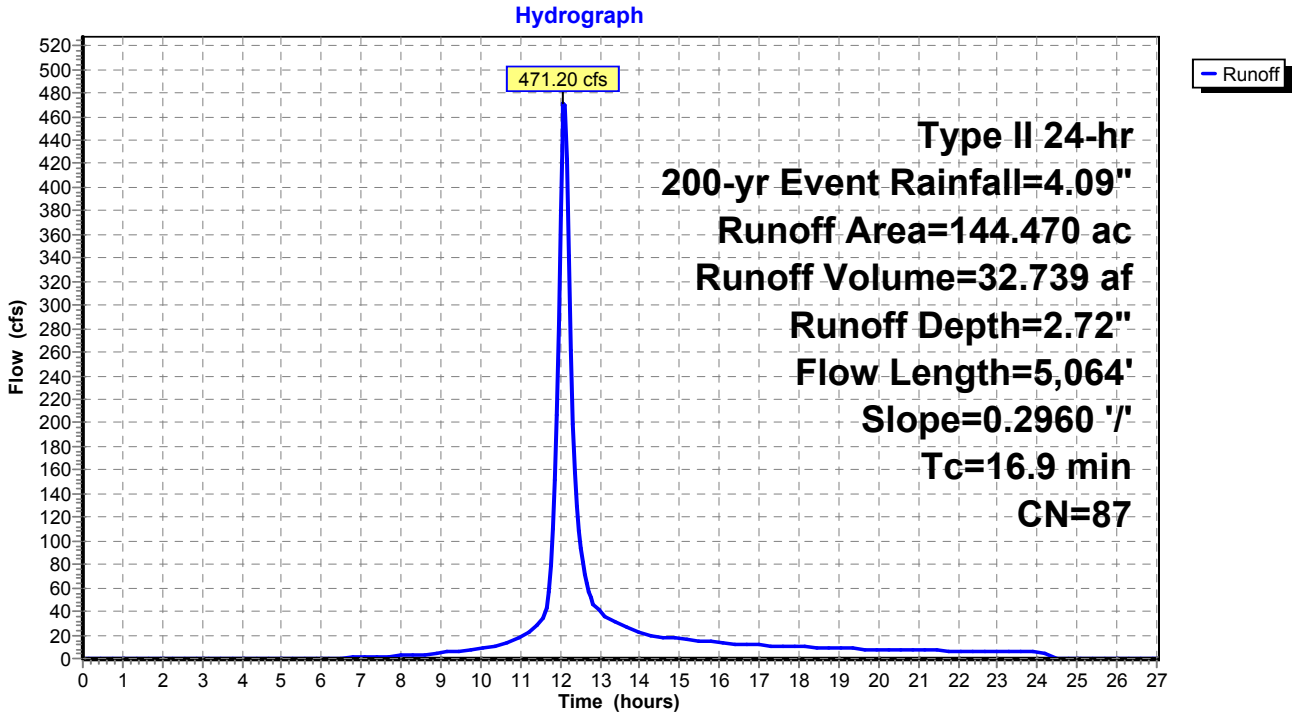
Runoff = 471.20 cfs @ 12.09 hrs, Volume= 32.739 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	5,064	0.2960	5.00		**Lag/CN Method,**

Subcatchment 7: WS 7



Existing Watersheds (Post-Quintana) *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 8: WS 8

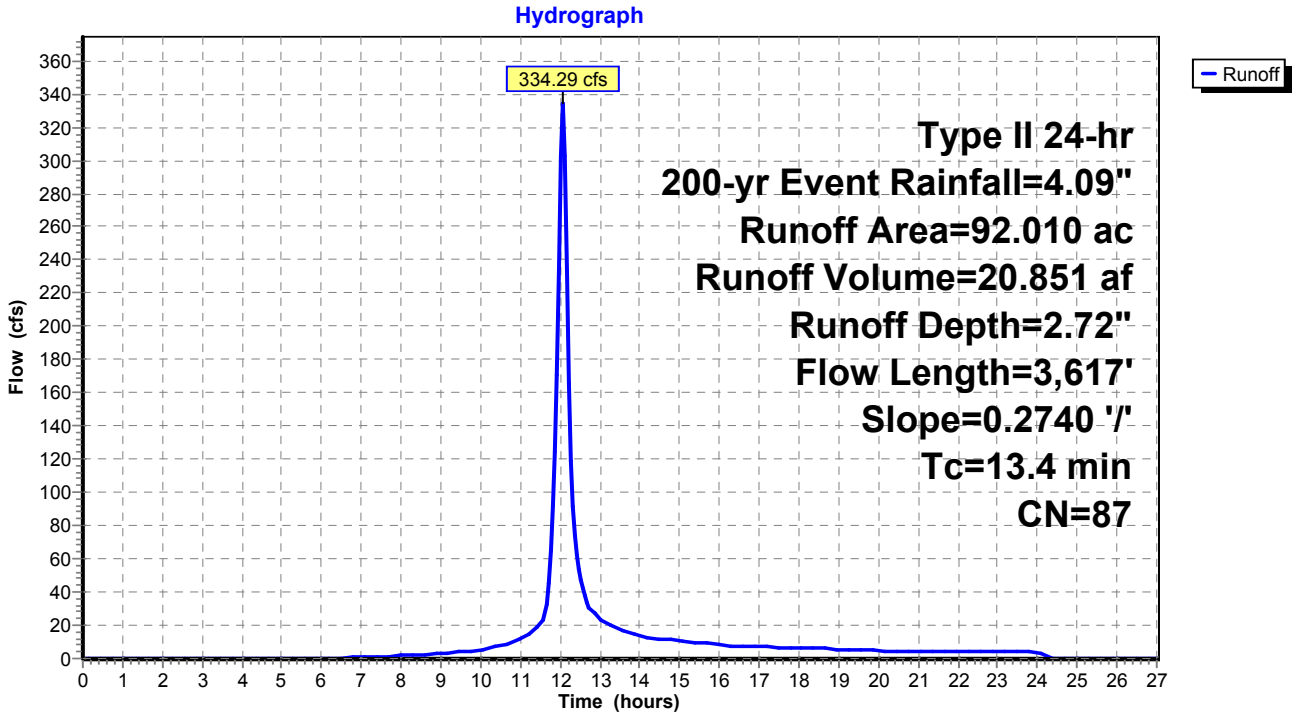
Runoff = 334.29 cfs @ 12.05 hrs, Volume= 20.851 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

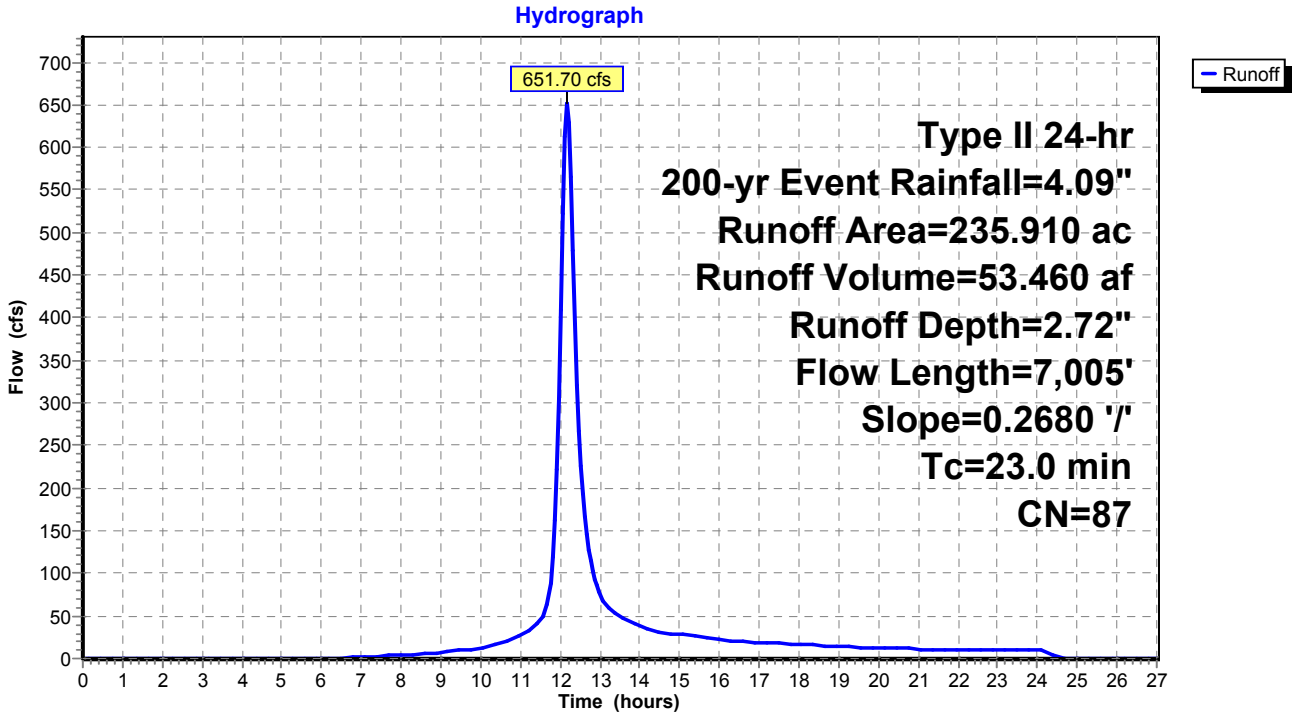
Runoff = 651.70 cfs @ 12.16 hrs, Volume= 53.460 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Summary for Subcatchment 10: WS 10

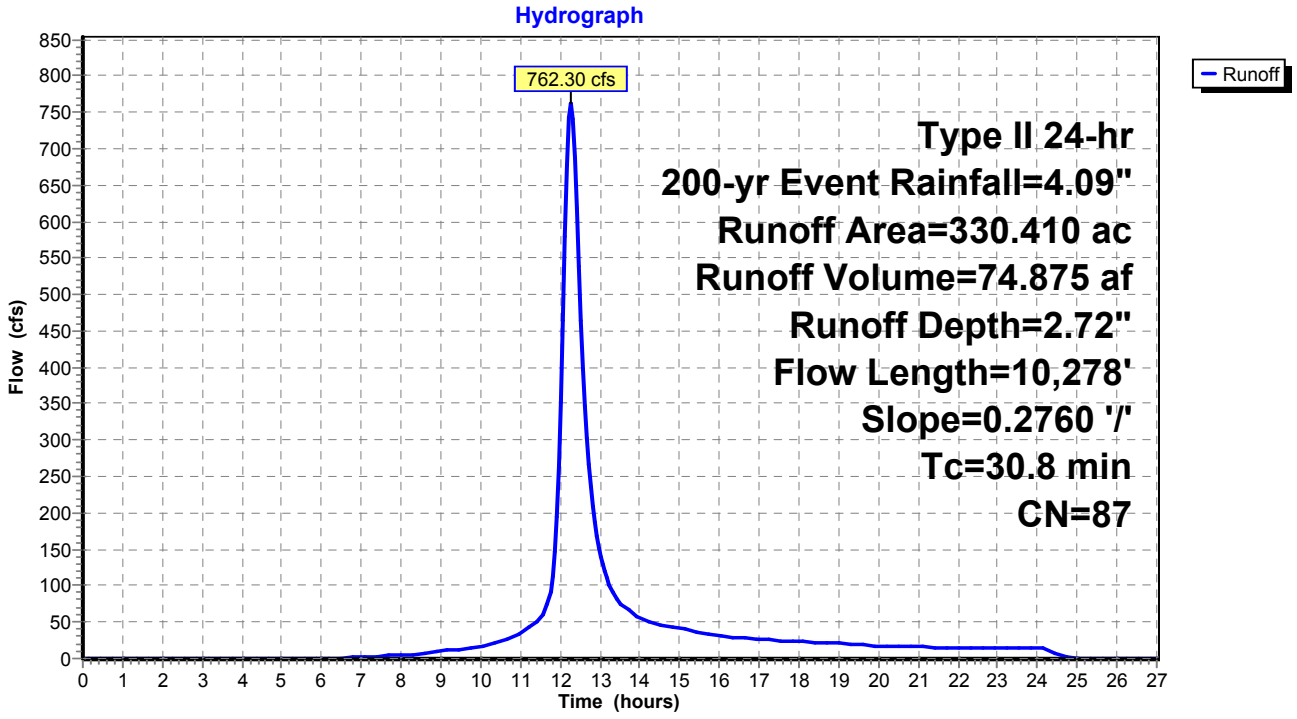
Runoff = 762.30 cfs @ 12.25 hrs, Volume= 74.875 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	297.370	86	Desert shrub range, Fair, HSG D
*	33.040	98	Impervious, HSG D
	330.410	87	Weighted Average
	297.370		90.00% Pervious Area
	33.040		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	10,278	0.2760	5.57		**Lag/CN Method,**

Subcatchment 10: WS 10



Summary for Subcatchment 11: WS 11

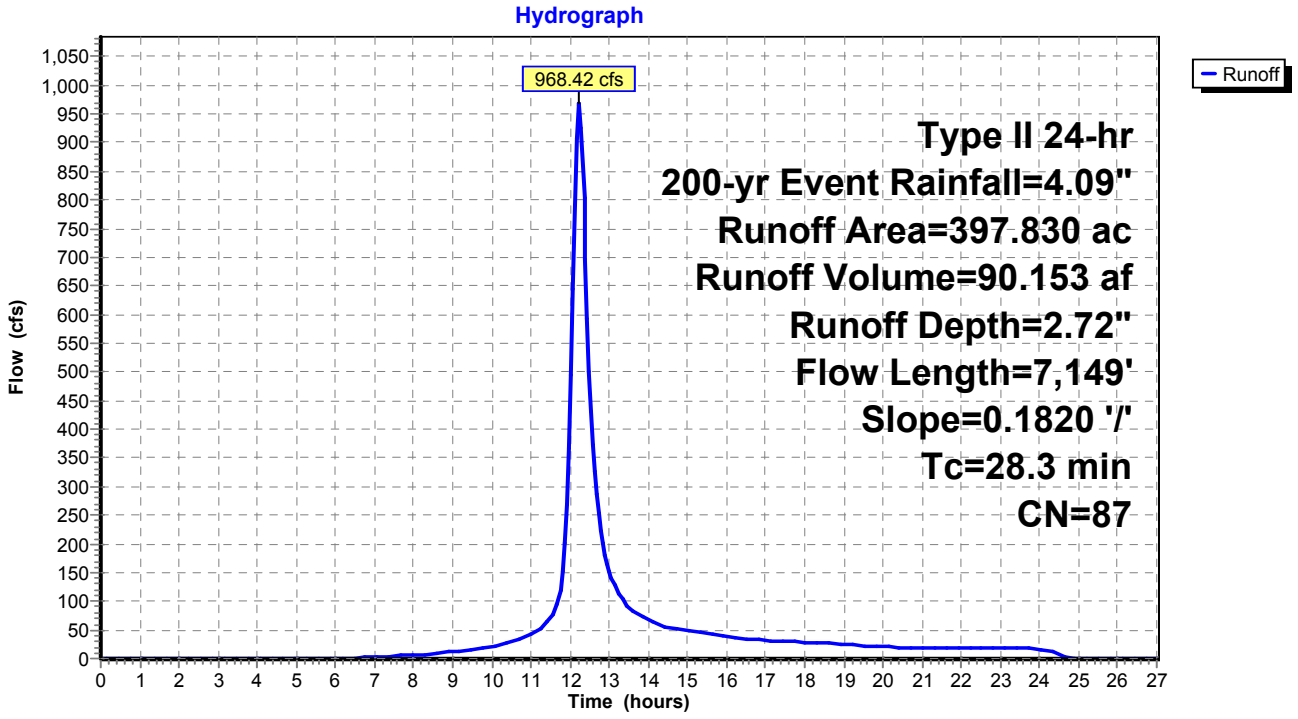
Runoff = 968.42 cfs @ 12.22 hrs, Volume= 90.153 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Summary for Subcatchment 12: WS 12

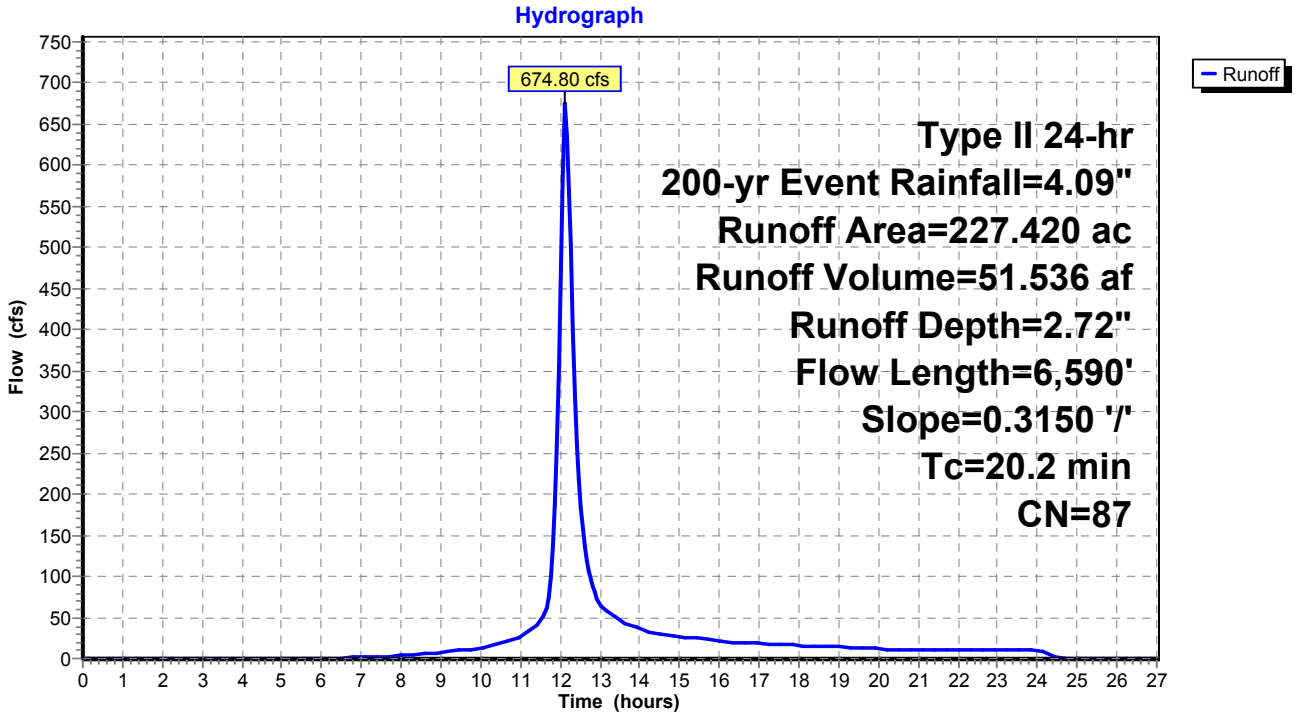
Runoff = 674.80 cfs @ 12.13 hrs, Volume= 51.536 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	204.680	86	Desert shrub range, Fair, HSG D
*	22.740	98	Impervious, HSG D
	227.420	87	Weighted Average
	204.680		90.00% Pervious Area
	22.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	6,590	0.3150	5.44		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

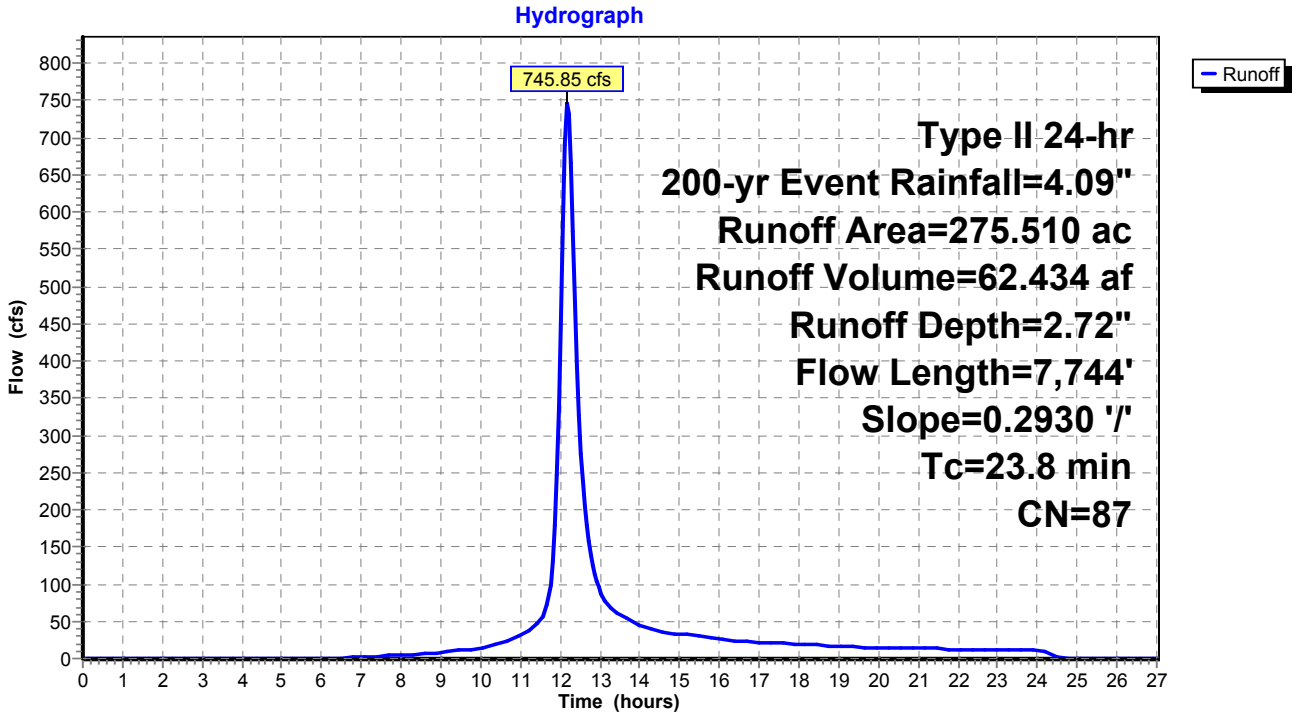
Runoff = 745.85 cfs @ 12.17 hrs, Volume= 62.434 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	247.960	86	Desert shrub range, Fair, HSG D
*	27.550	98	Impervious, HSG D
	275.510	87	Weighted Average
	247.960		90.00% Pervious Area
	27.550		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	7,744	0.2930	5.42		**Lag/CN Method,**

Subcatchment 13: WS 13



Summary for Subcatchment 14: WS 14

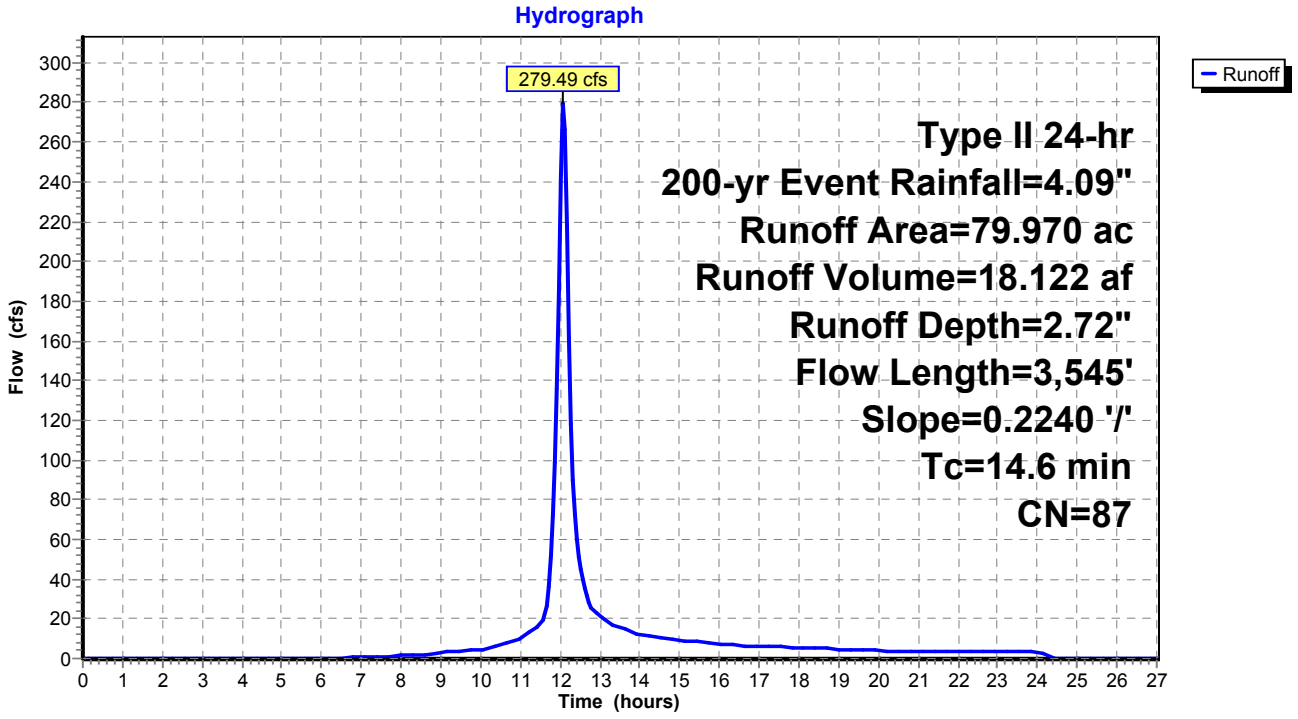
Runoff = 279.49 cfs @ 12.06 hrs, Volume= 18.122 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	71.970	86	Desert shrub range, Fair, HSG D
*	8.000	98	Impervious, HSG D
	79.970	87	Weighted Average
	71.970		90.00% Pervious Area
	8.000		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	3,545	0.2240	4.05		**Lag/CN Method,**

Subcatchment 14: WS 14



Existing Watersheds (Post-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=28.210 ac 10.00% Impervious Runoff Depth=3.19"
Tc=5.0 min CN=87 Runoff=155.94 cfs 7.504 af

Subcatchment2: WS 2 Runoff Area=106.570 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,068' Slope=0.3140 '/' Tc=11.0 min CN=87 Runoff=484.31 cfs 28.349 af

Subcatchment3: WS 3 Runoff Area=34.990 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=1,603' Slope=0.1770 '/' Tc=8.7 min CN=87 Runoff=172.66 cfs 9.308 af

Subcatchment4: WS 4 Runoff Area=75.020 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,047' Slope=0.3390 '/' Tc=10.5 min CN=87 Runoff=346.92 cfs 19.956 af

Subcatchment5: WS 5 Runoff Area=124.190 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=5,976' Slope=0.3400 '/' Tc=18.0 min CN=87 Runoff=458.61 cfs 33.036 af

Subcatchment6: WS 6 Runoff Area=331.220 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=8,173' Slope=0.3100 '/' Tc=24.2 min CN=87 Runoff=1,038.74 cfs 88.109 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=5,064' Slope=0.2960 '/' Tc=16.9 min CN=87 Runoff=550.14 cfs 38.431 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=389.99 cfs 24.476 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=761.76 cfs 62.755 af

Subcatchment10: WS 10 Runoff Area=330.410 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=10,278' Slope=0.2760 '/' Tc=30.8 min CN=87 Runoff=891.85 cfs 87.894 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=1,132.73 cfs 105.828 af

Subcatchment12: WS 12 Runoff Area=227.420 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=6,590' Slope=0.3150 '/' Tc=20.2 min CN=87 Runoff=789.72 cfs 60.497 af

Subcatchment13: WS 13 Runoff Area=275.510 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,744' Slope=0.2930 '/' Tc=23.8 min CN=87 Runoff=871.93 cfs 73.289 af

Subcatchment14: WS 14 Runoff Area=79.970 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,545' Slope=0.2240 '/' Tc=14.6 min CN=87 Runoff=326.19 cfs 21.273 af

Total Runoff Area = 2,483.730 ac Runoff Volume = 660.707 af Average Runoff Depth = 3.19"
90.00% Pervious = 2,235.360 ac 10.00% Impervious = 248.370 ac

Summary for Subcatchment 1: WS 1

[49] Hint: Tc<2dt may require smaller dt

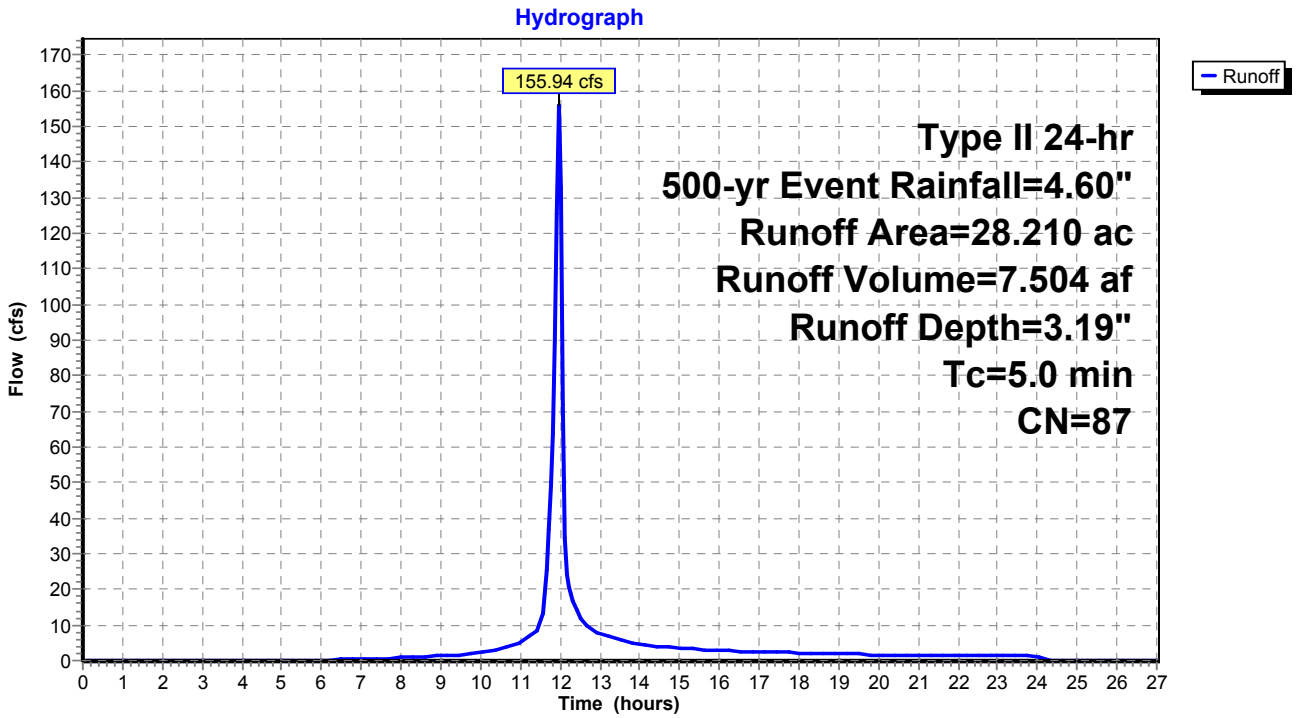
Runoff = 155.94 cfs @ 11.95 hrs, Volume= 7.504 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	25.390	86	Desert shrub range, Fair, HSG D
*	2.820	98	Impervious, HSG D
	28.210	87	Weighted Average
	25.390		90.00% Pervious Area
	2.820		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment 1: WS 1



Summary for Subcatchment 2: WS 2

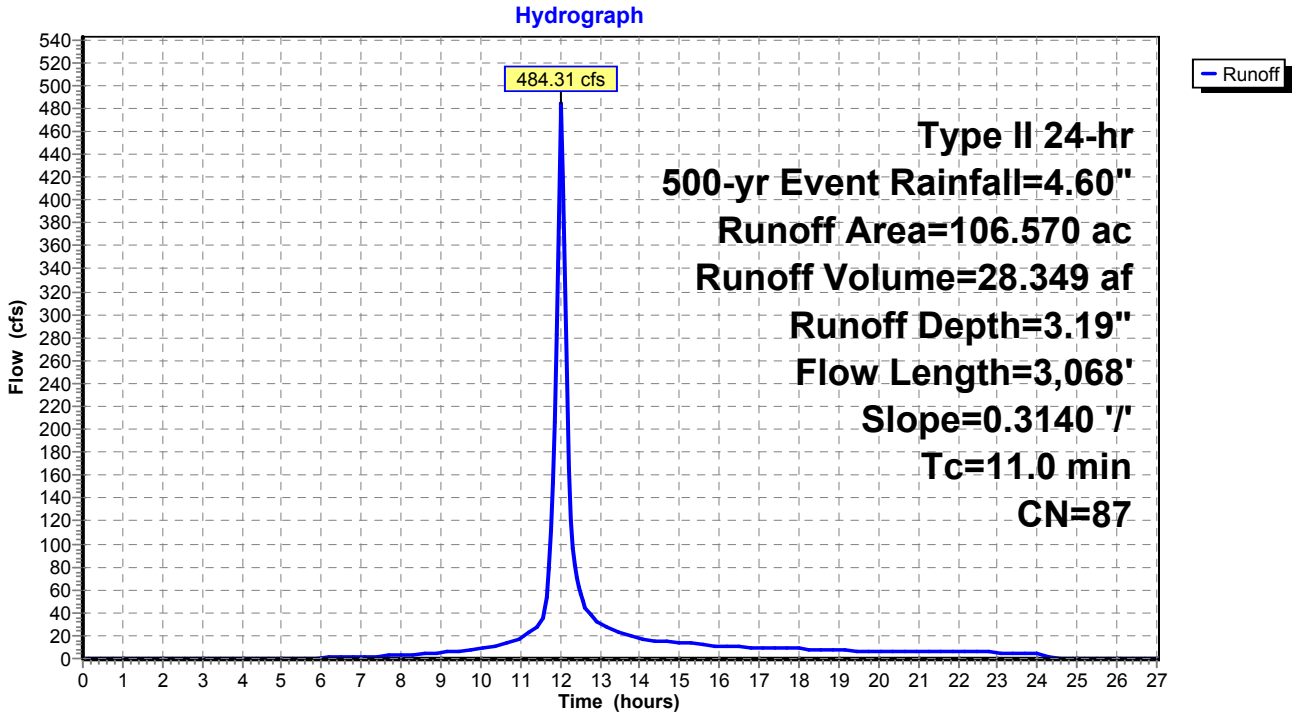
Runoff = 484.31 cfs @ 12.02 hrs, Volume= 28.349 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	95.910	86	Desert shrub range, Fair, HSG D
*	10.660	98	Impervious, HSG D
	106.570	87	Weighted Average
	95.910		90.00% Pervious Area
	10.660		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	3,068	0.3140	4.66		**Lag/CN Method,**

Subcatchment 2: WS 2



Summary for Subcatchment 3: WS 3

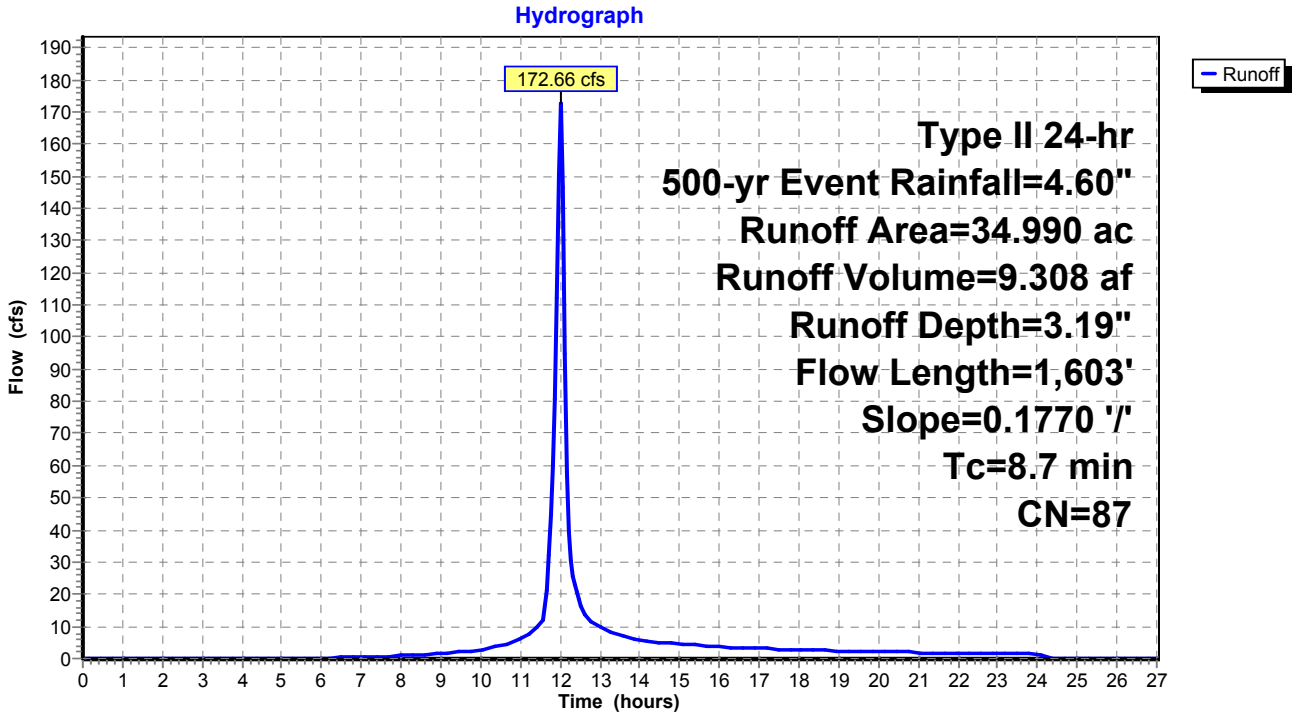
Runoff = 172.66 cfs @ 12.00 hrs, Volume= 9.308 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	31.490	86	Desert shrub range, Fair, HSG D
*	3.500	98	Impervious, HSG D
	34.990	87	Weighted Average
	31.490		90.00% Pervious Area
	3.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	1,603	0.1770	3.07		**Lag/CN Method,**

Subcatchment 3: WS 3



Summary for Subcatchment 4: WS 4

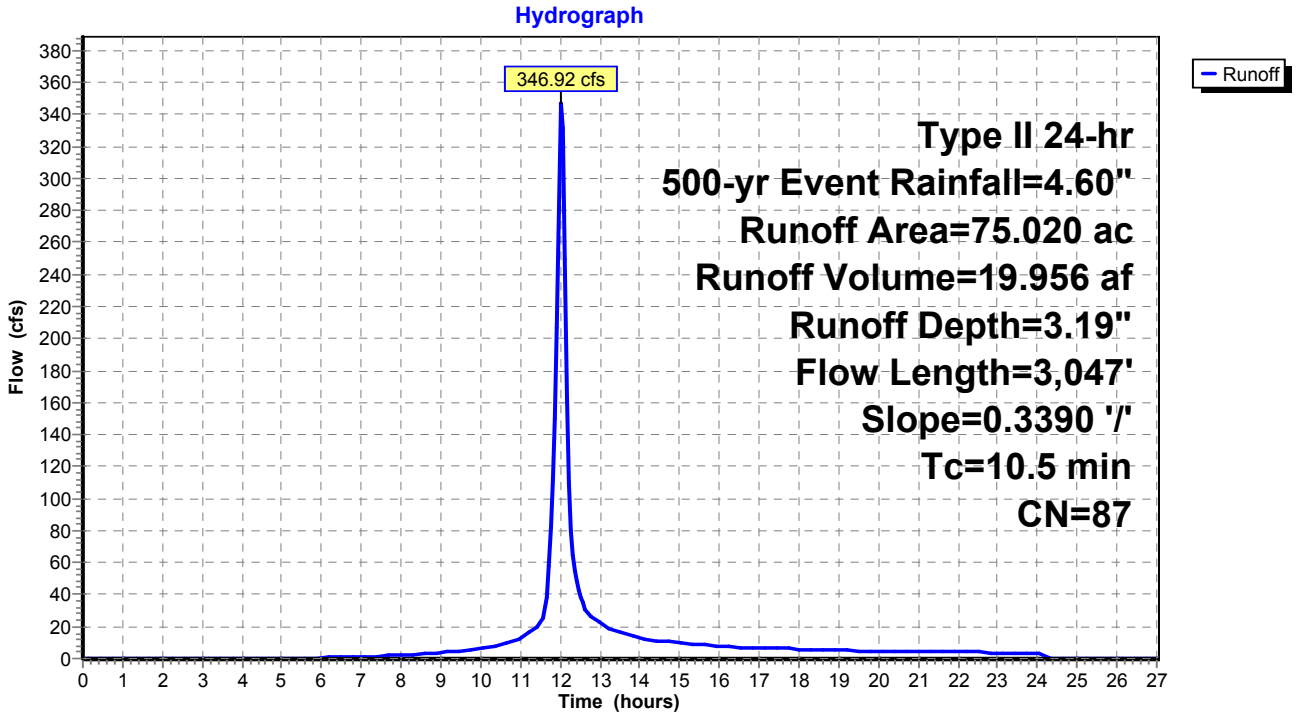
Runoff = 346.92 cfs @ 12.02 hrs, Volume= 19.956 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	67.520	86	Desert shrub range, Fair, HSG D
*	7.500	98	Impervious, HSG D
	75.020	87	Weighted Average
	67.520		90.00% Pervious Area
	7.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	3,047	0.3390	4.84		**Lag/CN Method,**

Subcatchment 4: WS 4



Summary for Subcatchment 5: WS 5

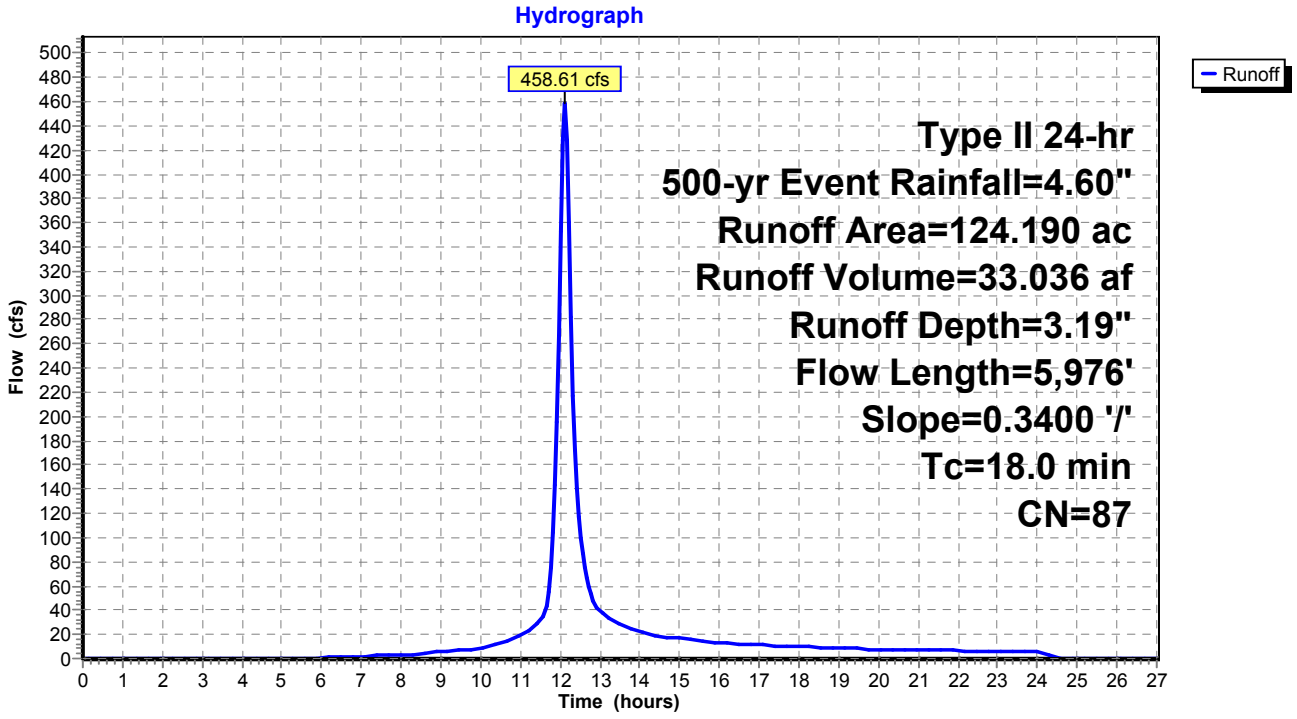
Runoff = 458.61 cfs @ 12.10 hrs, Volume= 33.036 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	111.770	86	Desert shrub range, Fair, HSG D
*	12.420	98	Impervious, HSG D
	124.190	87	Weighted Average
	111.770		90.00% Pervious Area
	12.420		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	5,976	0.3400	5.54		**Lag/CN Method,**

Subcatchment 5: WS 5



Existing Watersheds (Post-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 6: WS 6

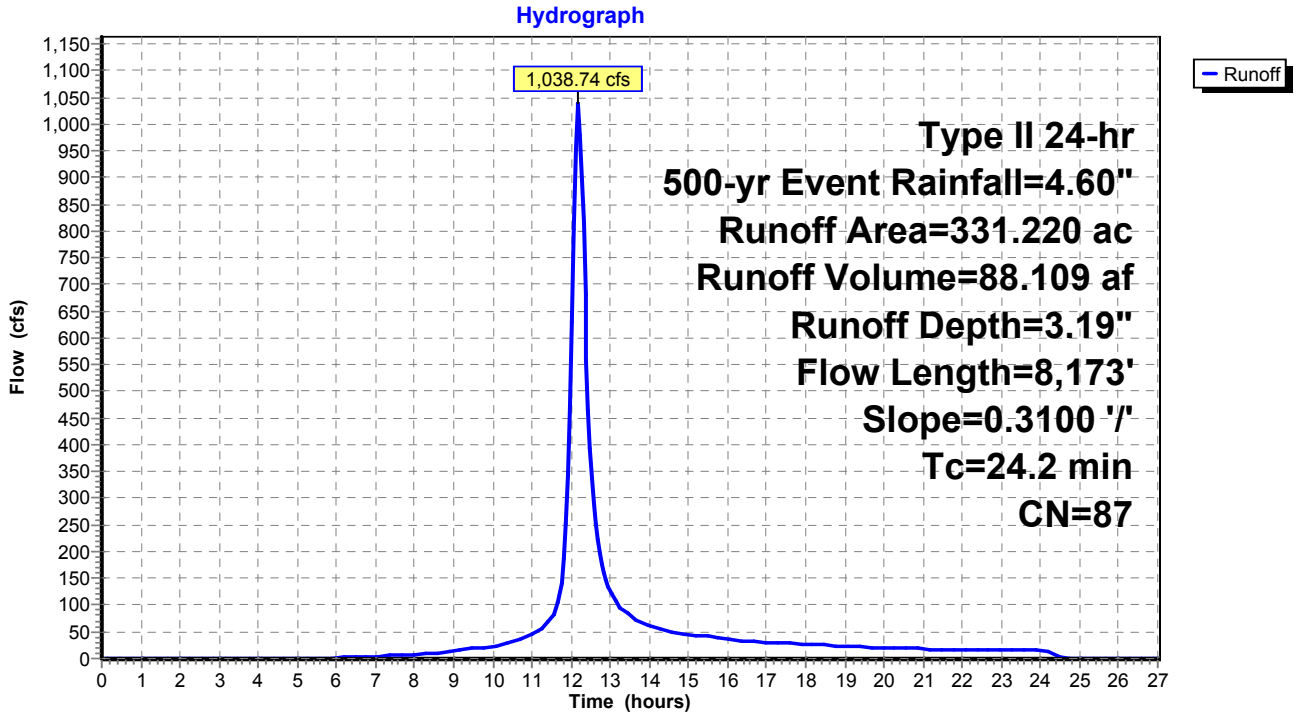
Runoff = 1,038.74 cfs @ 12.17 hrs, Volume= 88.109 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	298.100	86	Desert shrub range, Fair, HSG D
*	33.120	98	Impervious, HSG D
	331.220	87	Weighted Average
	298.100		90.00% Pervious Area
	33.120		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	8,173	0.3100	5.64		**Lag/CN Method,**

Subcatchment 6: WS 6



Summary for Subcatchment 7: WS 7

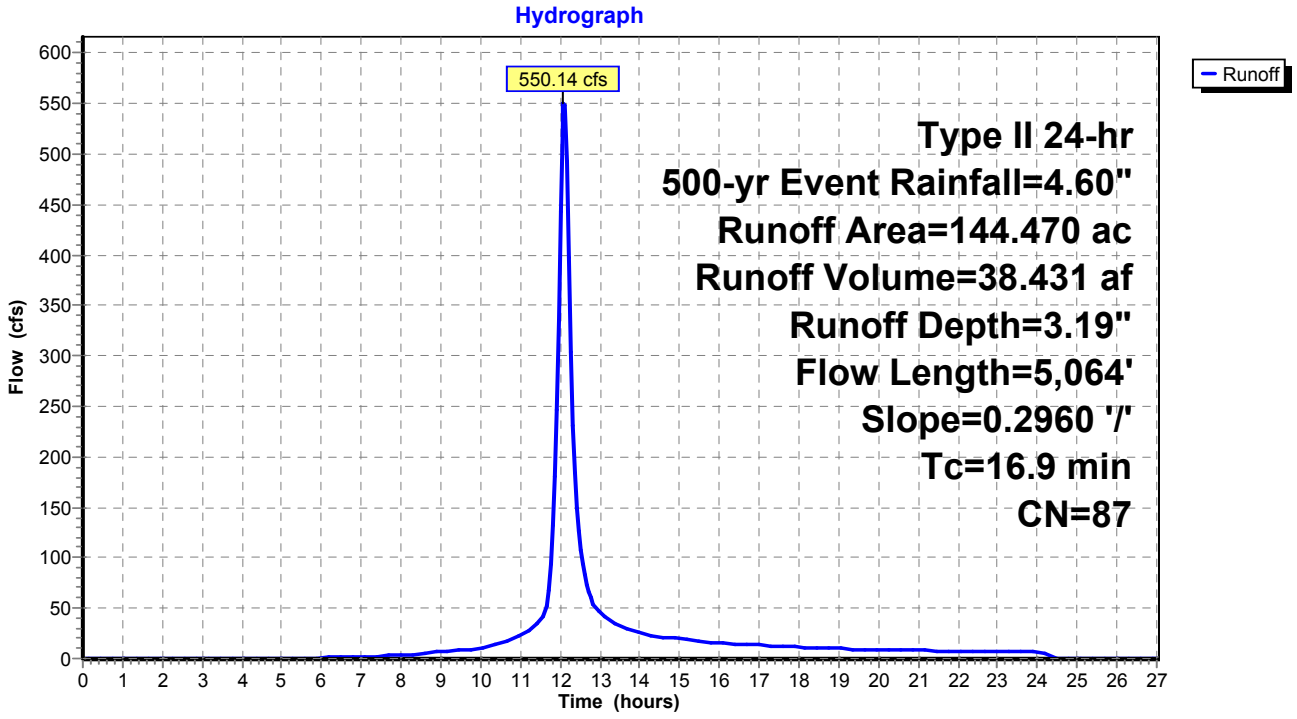
Runoff = 550.14 cfs @ 12.09 hrs, Volume= 38.431 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	5,064	0.2960	5.00		**Lag/CN Method,**

Subcatchment 7: WS 7



Existing Watersheds (Post-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 8: WS 8

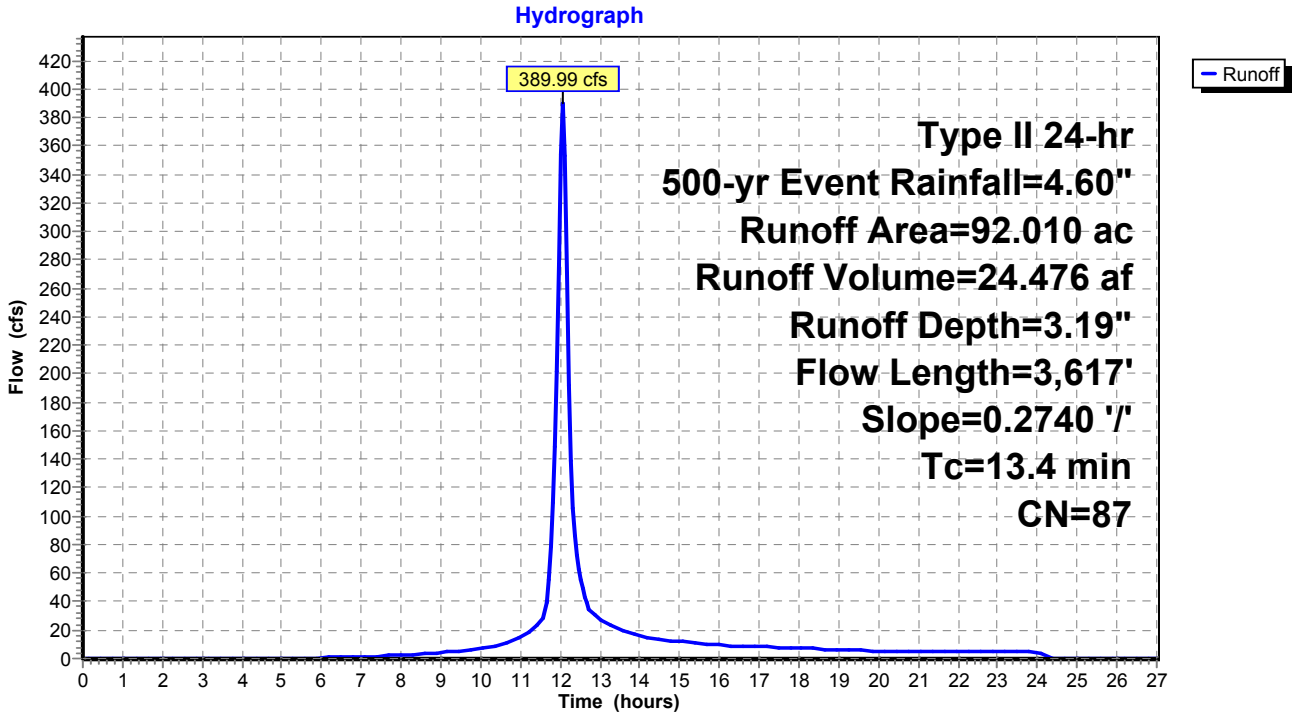
Runoff = 389.99 cfs @ 12.05 hrs, Volume= 24.476 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

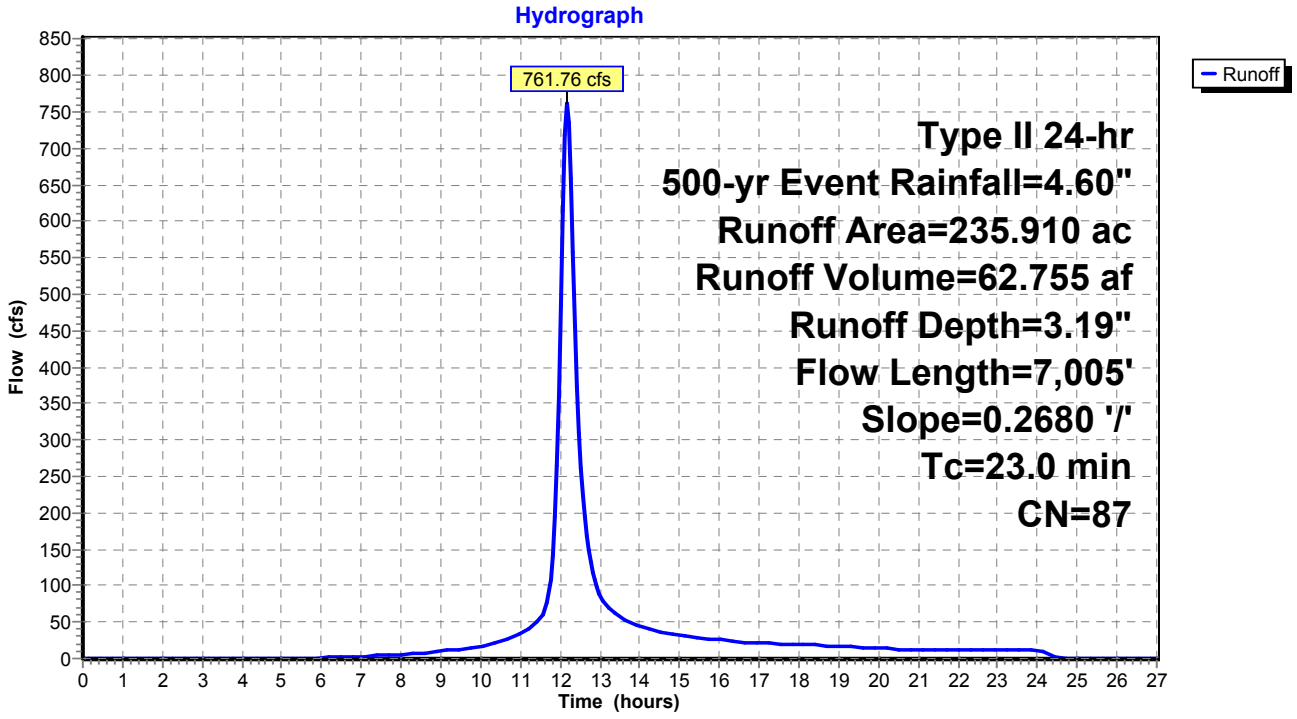
Runoff = 761.76 cfs @ 12.16 hrs, Volume= 62.755 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Existing Watersheds (Post-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 10: WS 10

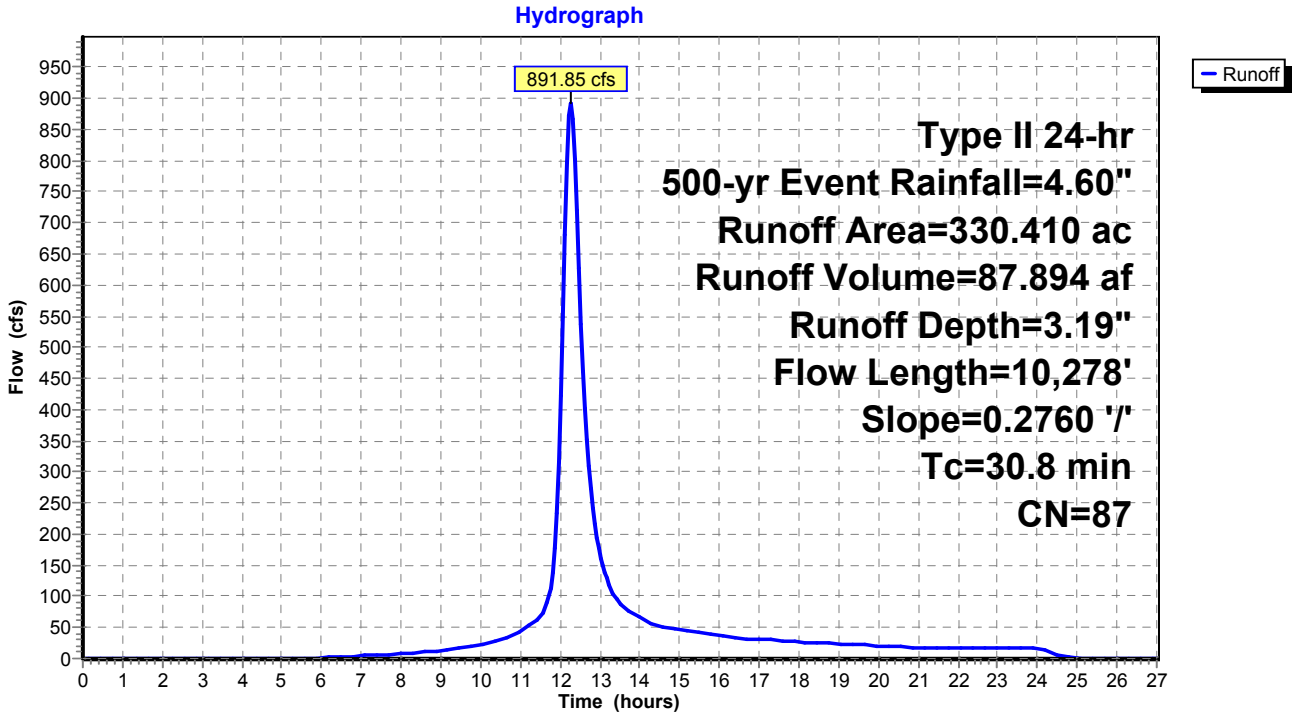
Runoff = 891.85 cfs @ 12.25 hrs, Volume= 87.894 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	297.370	86	Desert shrub range, Fair, HSG D
*	33.040	98	Impervious, HSG D
	330.410	87	Weighted Average
	297.370		90.00% Pervious Area
	33.040		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	10,278	0.2760	5.57		**Lag/CN Method,**

Subcatchment 10: WS 10



Summary for Subcatchment 11: WS 11

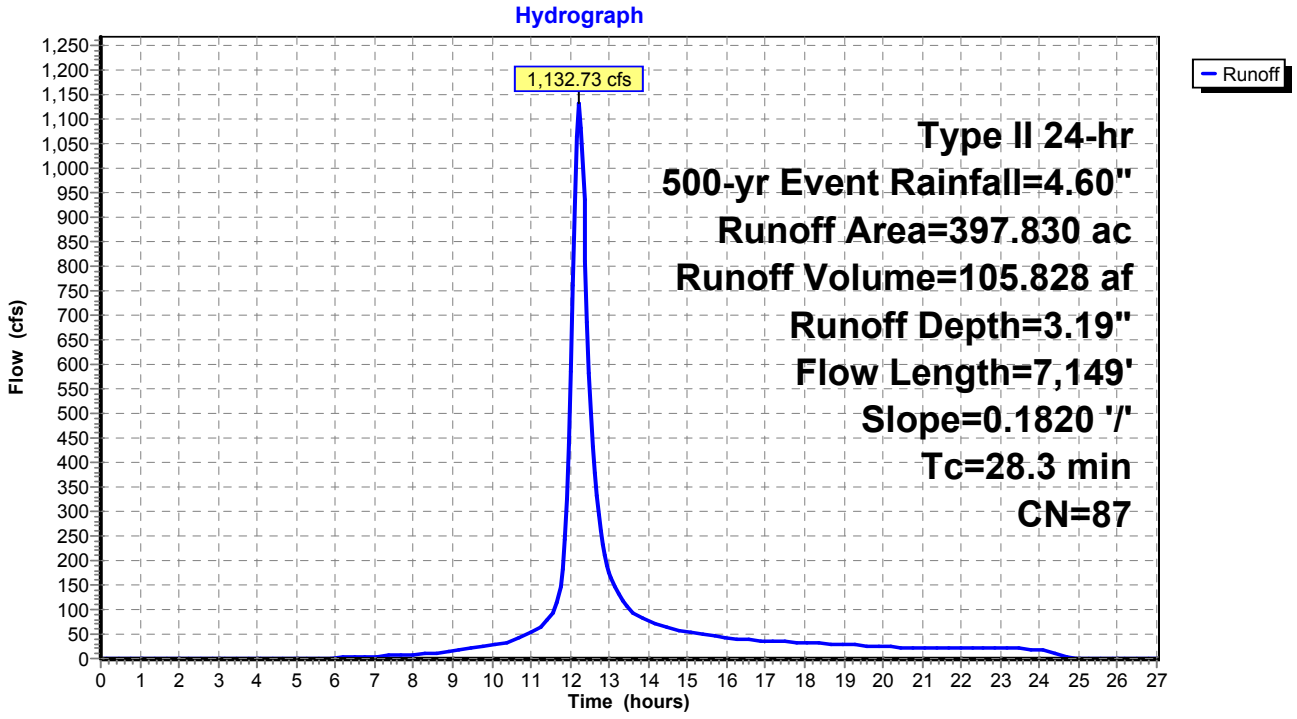
Runoff = 1,132.73 cfs @ 12.22 hrs, Volume= 105.828 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Summary for Subcatchment 12: WS 12

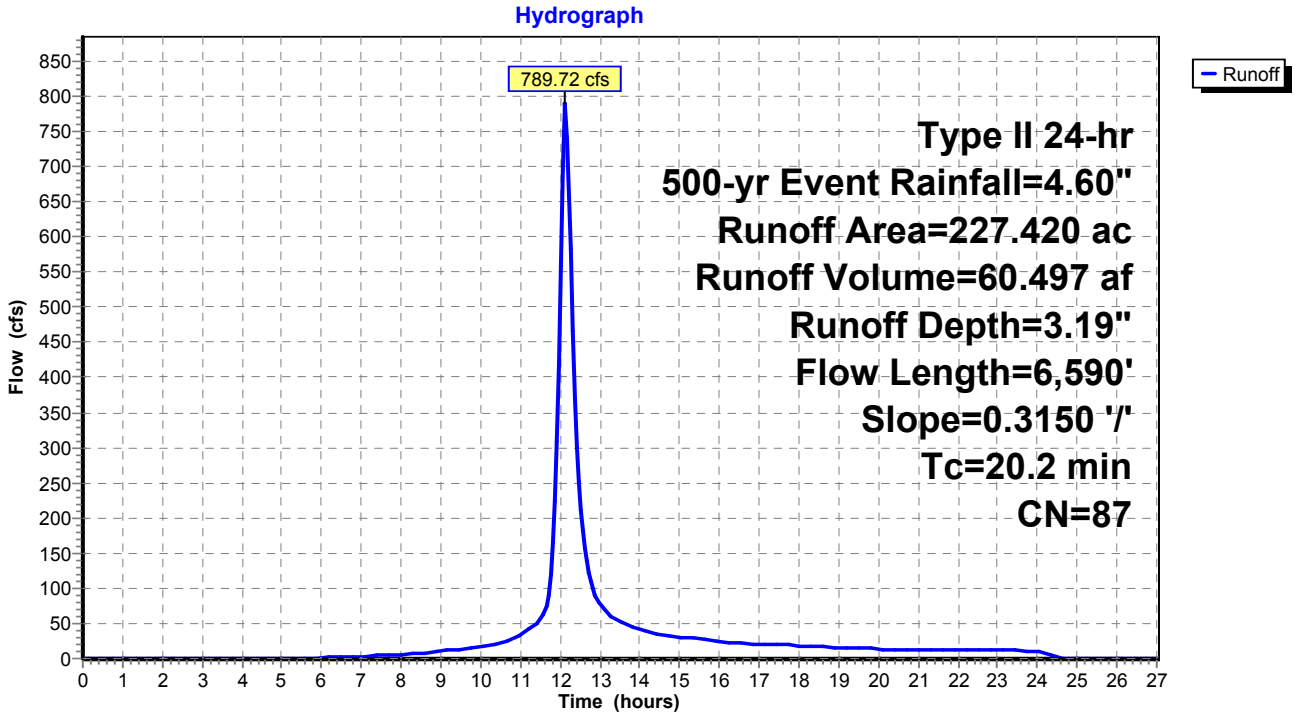
Runoff = 789.72 cfs @ 12.12 hrs, Volume= 60.497 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	204.680	86	Desert shrub range, Fair, HSG D
*	22.740	98	Impervious, HSG D
	227.420	87	Weighted Average
	204.680		90.00% Pervious Area
	22.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	6,590	0.3150	5.44		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

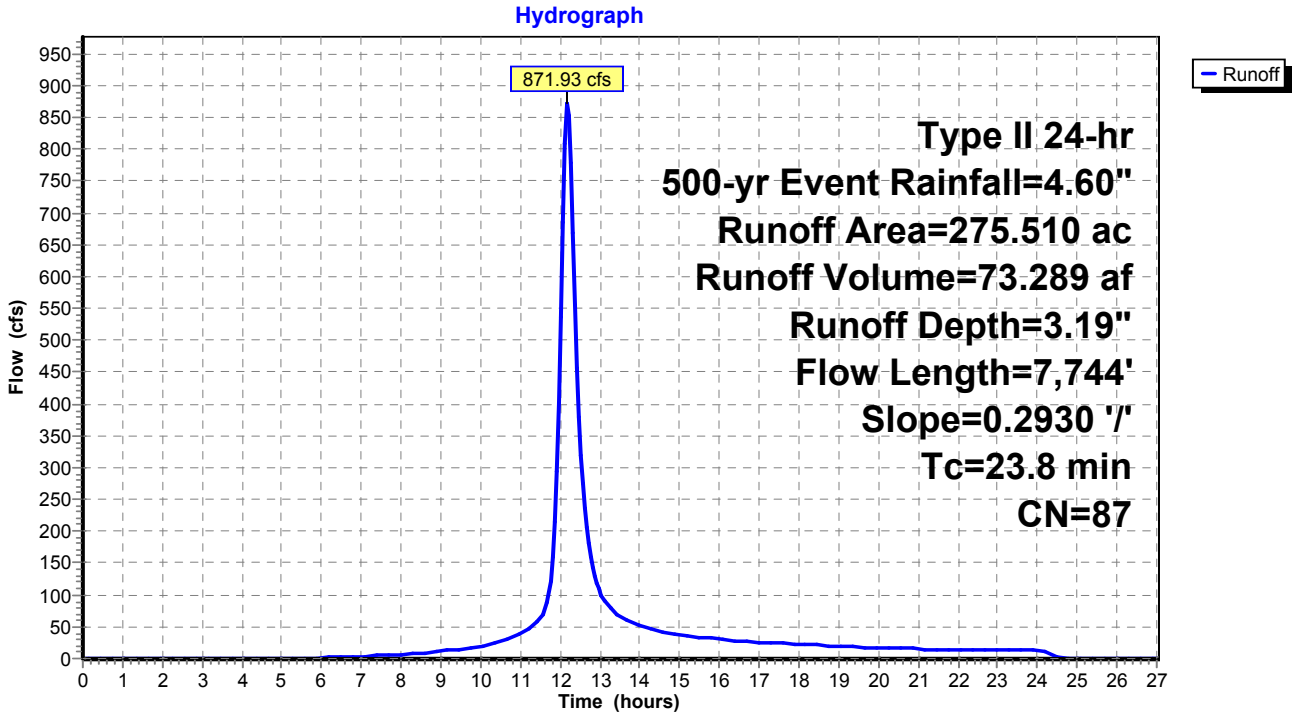
Runoff = 871.93 cfs @ 12.16 hrs, Volume= 73.289 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	247.960	86	Desert shrub range, Fair, HSG D
*	27.550	98	Impervious, HSG D
	275.510	87	Weighted Average
	247.960		90.00% Pervious Area
	27.550		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	7,744	0.2930	5.42		**Lag/CN Method,**

Subcatchment 13: WS 13



Existing Watersheds (Post-Quintana) *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 14: WS 14

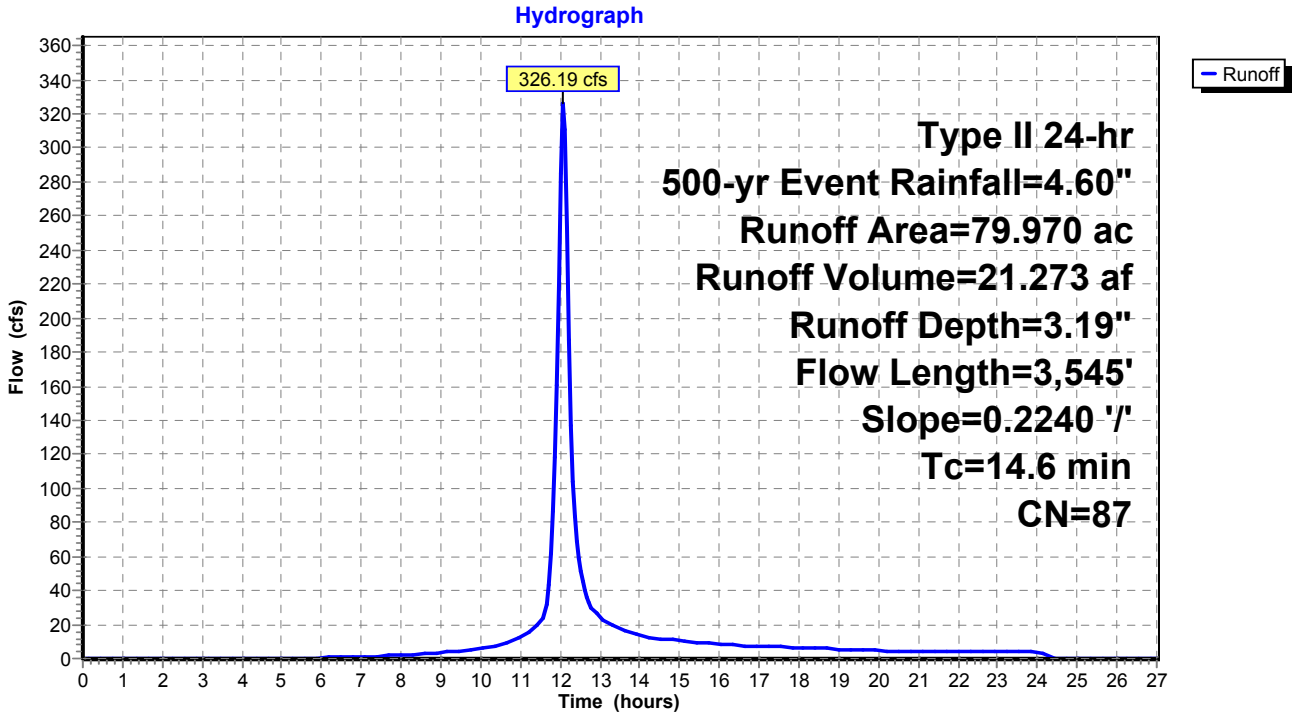
Runoff = 326.19 cfs @ 12.06 hrs, Volume= 21.273 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

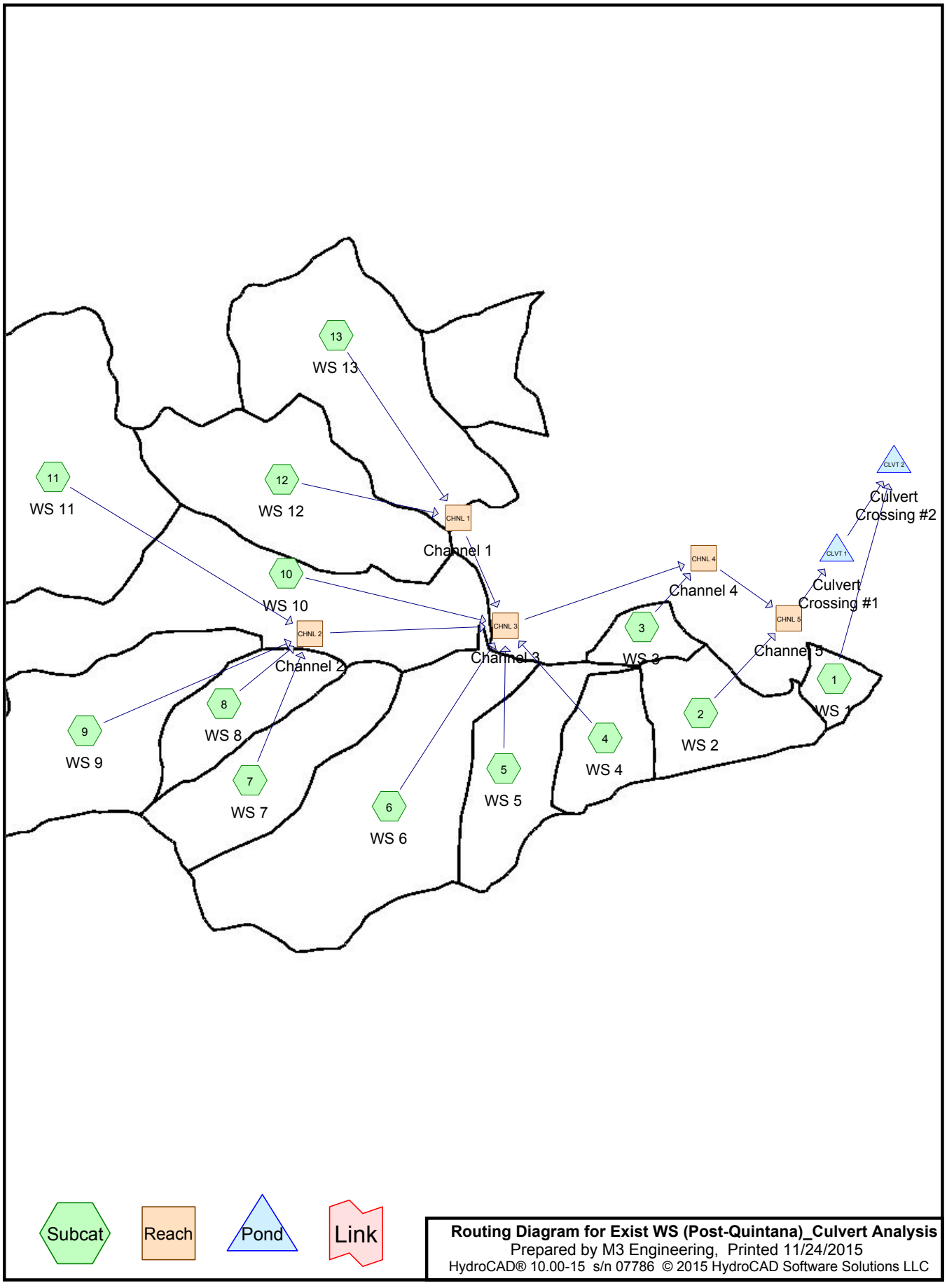
	Area (ac)	CN	Description
	71.970	86	Desert shrub range, Fair, HSG D
*	8.000	98	Impervious, HSG D
	79.970	87	Weighted Average
	71.970		90.00% Pervious Area
	8.000		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	3,545	0.2240	4.05		**Lag/CN Method,**

Subcatchment 14: WS 14



APPENDIX D


13
WS 13
11
WS 11
12
WS 12
CHNL 1
Channel 1
CLVT 2
Culvert
Crossing #2
CLVT 1
Culvert
Crossing #1
CHNL 4
Channel 4
10
WS 10
CHNL 2
Channel 2
CHNL 3
Channel 3
3
WS 3
CHNL 5
Channel 5
1
WS 1
2
WS 2
9
WS 9
8
WS 8
4
WS 4
7
WS 7
5
WS 5
6
WS 6
Subcat
Reach
Pond
Link
Routing Diagram for Exist WS (Post-Quintana)_Culvert Analysis
Prepared by M3 Engineering, Printed 11/24/2015
HydroCAD® 10.00-15 s/n 07786 © 2015 HydroCAD Software Solutions LLC

Exist WS (Post-Quintana)_Culvert Analysis
Prepared by M3 Engineering Printed 11/24/2015

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2,163.390	86	Desert shrub range, Fair, HSG D (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13)
240.370	98	Impervious, HSG D (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13)
2,403.760	**87**	**TOTAL AREA**

Exist WS (Post-Quintana)_Culvert Analysis
Prepared by M3 Engineering Printed 11/24/2015

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
2,403.760	HSG D	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
0.000	Other	
2,403.760		**TOTAL AREA**

Exist WS (Post-Quintana)_Culvert Analysis
Prepared by M3 Engineering Printed 11/24/2015

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	2,163.390	0.000	2,163.390	Desert shrub range, Fair	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
0.000	0.000	0.000	240.370	0.000	240.370	Impervious	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
0.000	**0.000**	**0.000**	**2,403.760**	**0.000**	**2,403.760**	**TOTAL AREA**	

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=28.210 ac 10.00% Impervious Runoff Depth=2.36"
Tc=5.0 min CN=87 Runoff=117.20 cfs 5.555 af

Subcatchment2: WS 2 Runoff Area=106.570 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,068' Slope=0.3140 '/' Tc=11.0 min CN=87 Runoff=363.66 cfs 20.985 af

Subcatchment3: WS 3 Runoff Area=34.990 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=1,603' Slope=0.1770 '/' Tc=8.7 min CN=87 Runoff=129.54 cfs 6.890 af

Subcatchment4: WS 4 Runoff Area=75.020 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,047' Slope=0.3390 '/' Tc=10.5 min CN=87 Runoff=259.92 cfs 14.773 af

Subcatchment5: WS 5 Runoff Area=124.190 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=5,976' Slope=0.3400 '/' Tc=18.0 min CN=87 Runoff=342.49 cfs 24.455 af

Subcatchment6: WS 6 Runoff Area=331.220 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=8,173' Slope=0.3100 '/' Tc=24.2 min CN=87 Runoff=774.13 cfs 65.223 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=5,064' Slope=0.2960 '/' Tc=16.9 min CN=87 Runoff=411.06 cfs 28.449 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=291.83 cfs 18.118 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=567.91 cfs 46.455 af

Subcatchment10: WS 10 Runoff Area=330.410 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=10,278' Slope=0.2760 '/' Tc=30.8 min CN=87 Runoff=663.73 cfs 65.063 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=843.39 cfs 78.339 af

Subcatchment12: WS 12 Runoff Area=227.420 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=6,590' Slope=0.3150 '/' Tc=20.2 min CN=87 Runoff=588.30 cfs 44.783 af

Subcatchment13: WS 13 Runoff Area=275.510 ac 10.00% Impervious Runoff Depth=2.36"
Flow Length=7,744' Slope=0.2930 '/' Tc=23.8 min CN=87 Runoff=649.87 cfs 54.252 af

Reach CHNL 1: Channel 1 Avg. Flow Depth=2.49' Max Vel=8.88 fps Inflow=1,228.49 cfs 99.035 af
n=0.036 L=1,919.0' S=0.0155 '/' Capacity=12,871.33 cfs Outflow=1,184.09 cfs 99.033 af

Reach CHNL 2: Channel 2 Avg. Flow Depth=1.68' Max Vel=9.03 fps Inflow=1,933.74 cfs 171.361 af
n=0.036 L=7,061.5' S=0.0255 '/' Capacity=32,870.94 cfs Outflow=1,565.27 cfs 170.940 af

Reach CHNL 3: Channel 3 Avg. Flow Depth=5.30' Max Vel=13.90 fps Inflow=3,580.90 cfs 439.487 af
n=0.036 L=3,680.5' S=0.0162 '/' Capacity=10,812.70 cfs Outflow=3,520.63 cfs 439.082 af

Reach CHNL 4: Channel 4 Avg. Flow Depth=3.72' Max Vel=20.81 fps Inflow=3,535.74 cfs 445.972 af
n=0.036 L=1,100.0' S=0.0545 '/' Capacity=19,828.03 cfs Outflow=3,523.29 cfs 445.885 af

Reach CHNL 5: Channel 5 Avg. Flow Depth=6.13' Max Vel=16.97 fps Inflow=3,572.05 cfs 466.870 af
n=0.036 L=2,163.7' S=0.0231 '/' Capacity=10,541.66 cfs Outflow=3,552.39 cfs 466.654 af

Pond CLVT 1: Culvert Crossing Peak Elev=5,389.78' Storage=1,214,495 cf Inflow=3,552.39 cfs 466.654 af
117.0" Round Culvert x 3.00 n=0.024 L=194.4' S=0.0103 '/' Outflow=3,058.70 cfs 466.511 af

Pond CLVT 2: Culvert Crossing Peak Elev=5,386.54' Storage=5,175,763 cf Inflow=3,066.00 cfs 472.066 af
117.0" Round Culvert n=0.024 L=255.4' S=0.0313 '/' Outflow=1,545.71 cfs 472.015 af

Total Runoff Area = 2,403.760 ac Runoff Volume = 473.340 af Average Runoff Depth = 2.36"
90.00% Pervious = 2,163.390 ac 10.00% Impervious = 240.370 ac

Summary for Subcatchment 1: WS 1

[49] Hint: Tc<2dt may require smaller dt

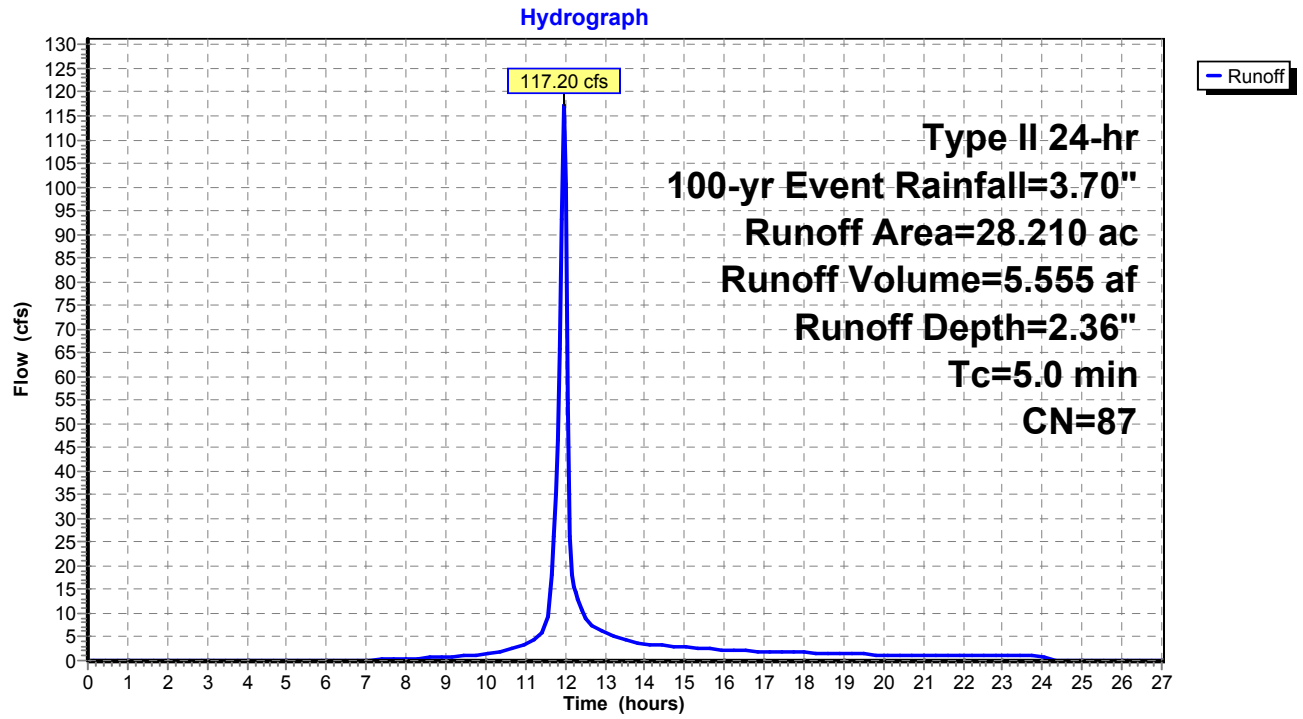
Runoff = 117.20 cfs @ 11.95 hrs, Volume= 5.555 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	25.390	86	Desert shrub range, Fair, HSG D
*	2.820	98	Impervious, HSG D
	28.210	87	Weighted Average
	25.390		90.00% Pervious Area
	2.820		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment 1: WS 1



Summary for Subcatchment 2: WS 2

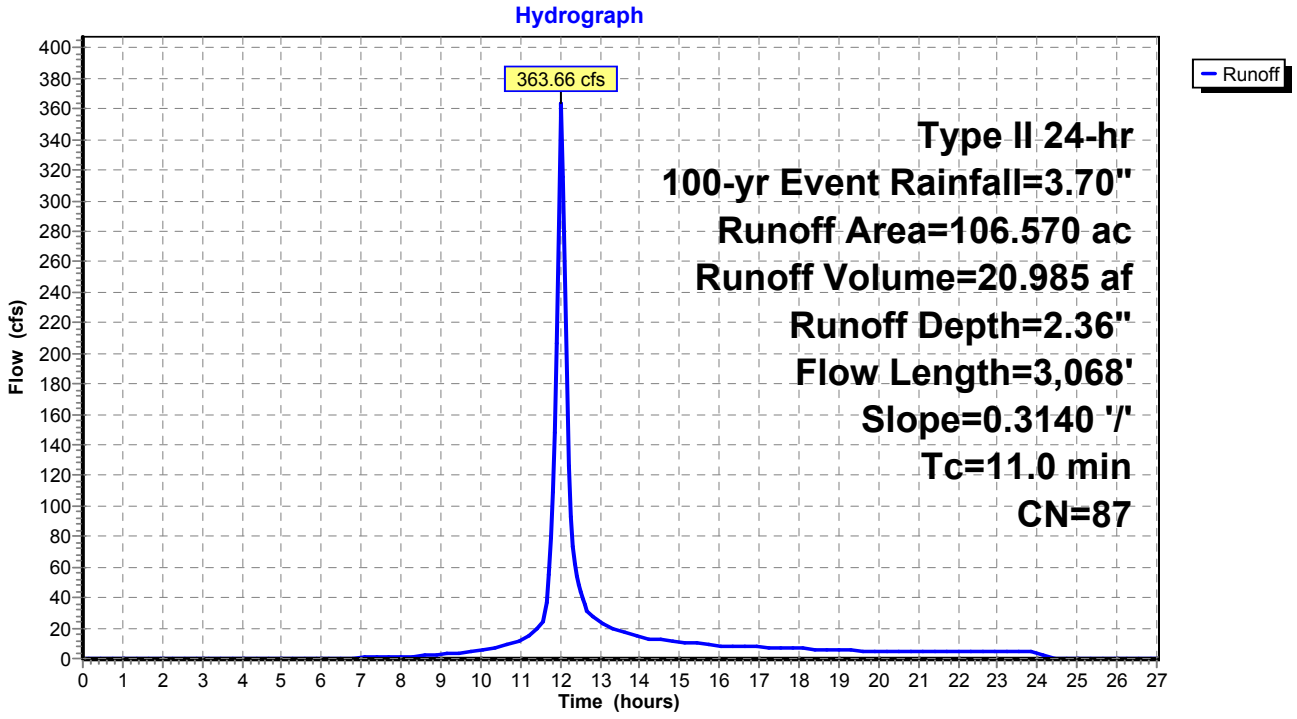
Runoff = 363.66 cfs @ 12.03 hrs, Volume= 20.985 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	95.910	86	Desert shrub range, Fair, HSG D
*	10.660	98	Impervious, HSG D
	106.570	87	Weighted Average
	95.910		90.00% Pervious Area
	10.660		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	3,068	0.3140	4.66		**Lag/CN Method,**

Subcatchment 2: WS 2



Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 3: WS 3

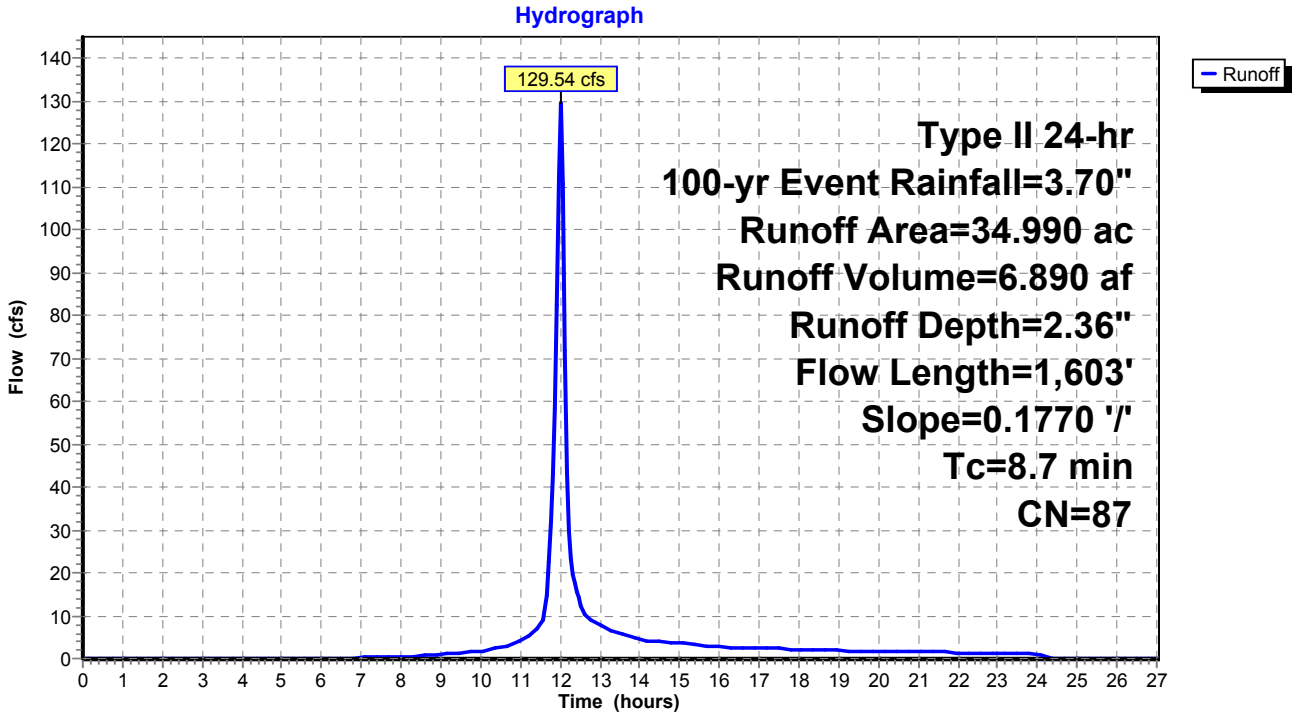
Runoff = 129.54 cfs @ 12.00 hrs, Volume= 6.890 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	31.490	86	Desert shrub range, Fair, HSG D
*	3.500	98	Impervious, HSG D
	34.990	87	Weighted Average
	31.490		90.00% Pervious Area
	3.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	1,603	0.1770	3.07		**Lag/CN Method,**

Subcatchment 3: WS 3



Summary for Subcatchment 4: WS 4

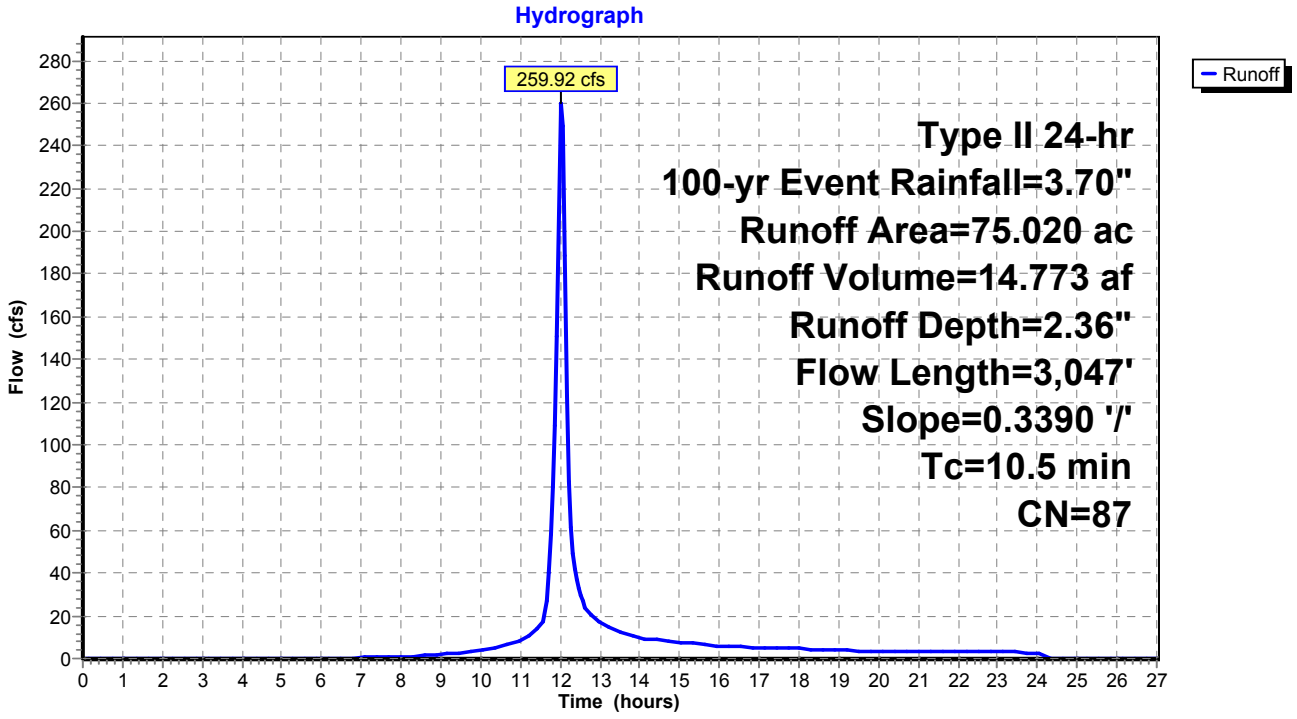
Runoff = 259.92 cfs @ 12.02 hrs, Volume= 14.773 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	67.520	86	Desert shrub range, Fair, HSG D
*	7.500	98	Impervious, HSG D
	75.020	87	Weighted Average
	67.520		90.00% Pervious Area
	7.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	3,047	0.3390	4.84		**Lag/CN Method,**

Subcatchment 4: WS 4



Summary for Subcatchment 5: WS 5

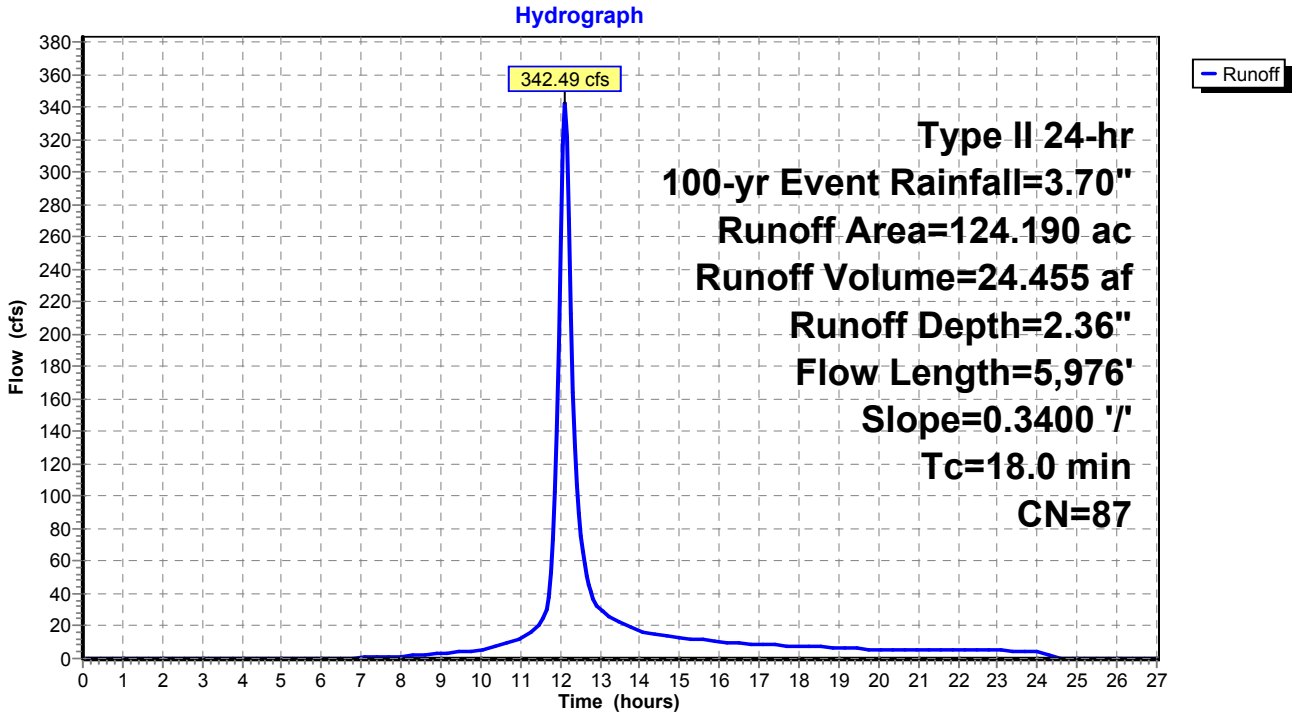
Runoff = 342.49 cfs @ 12.10 hrs, Volume= 24.455 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	111.770	86	Desert shrub range, Fair, HSG D
*	12.420	98	Impervious, HSG D
	124.190	87	Weighted Average
	111.770		90.00% Pervious Area
	12.420		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	5,976	0.3400	5.54		**Lag/CN Method,**

Subcatchment 5: WS 5



Summary for Subcatchment 6: WS 6

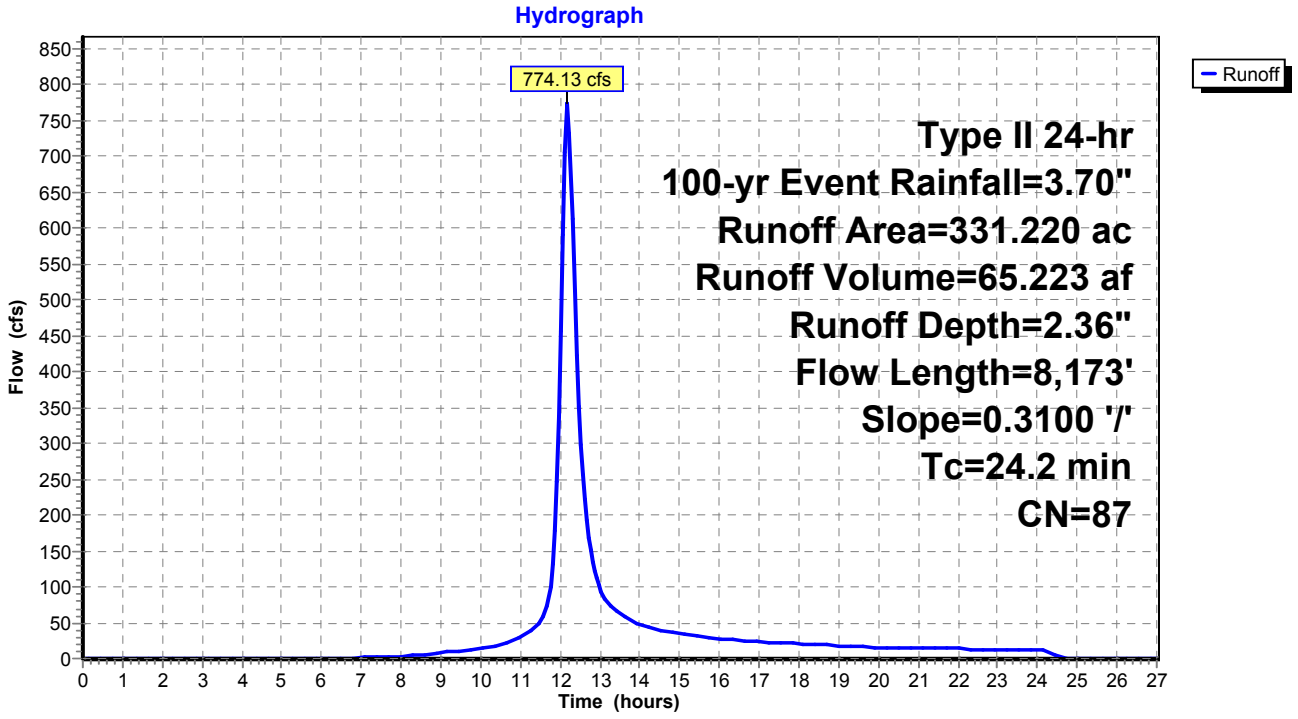
Runoff = 774.13 cfs @ 12.17 hrs, Volume= 65.223 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	298.100	86	Desert shrub range, Fair, HSG D
*	33.120	98	Impervious, HSG D
	331.220	87	Weighted Average
	298.100		90.00% Pervious Area
	33.120		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	8,173	0.3100	5.64		**Lag/CN Method,**

Subcatchment 6: WS 6



Summary for Subcatchment 7: WS 7

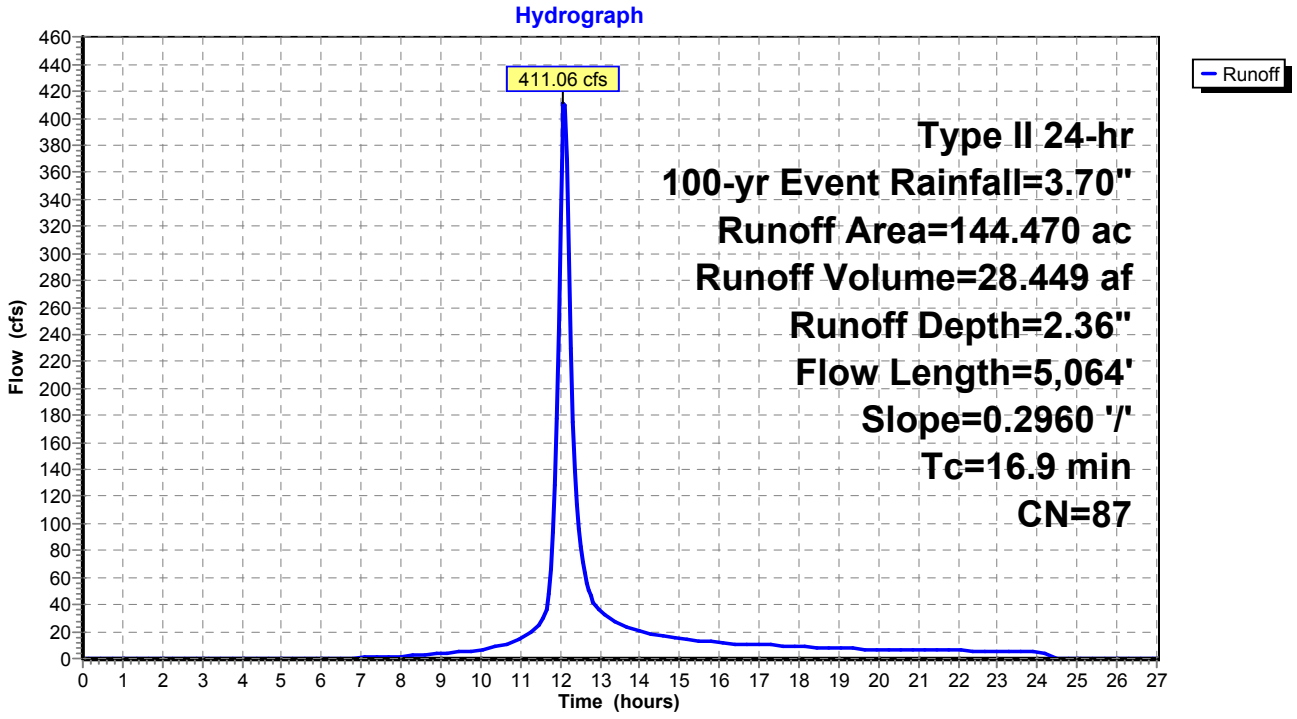
Runoff = 411.06 cfs @ 12.09 hrs, Volume= 28.449 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	5,064	0.2960	5.00		**Lag/CN Method,**

Subcatchment 7: WS 7



Summary for Subcatchment 8: WS 8

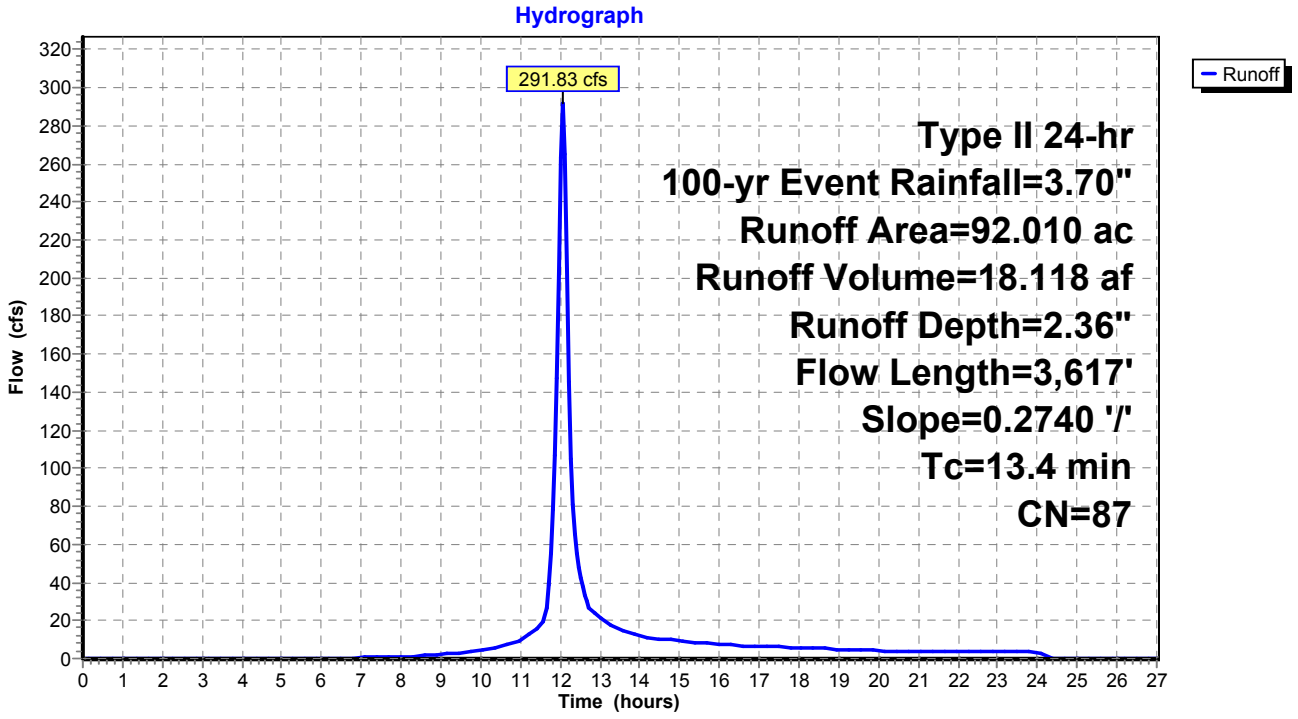
Runoff = 291.83 cfs @ 12.05 hrs, Volume= 18.118 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

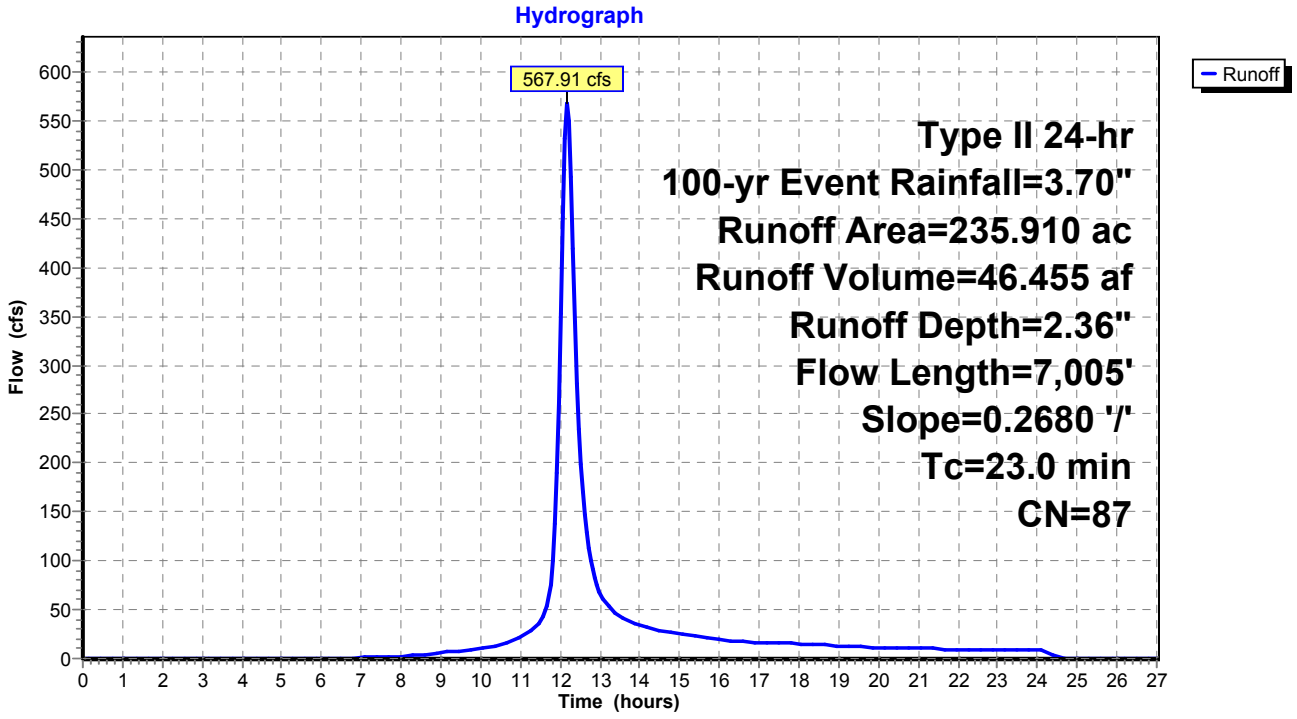
Runoff = 567.91 cfs @ 12.16 hrs, Volume= 46.455 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Summary for Subcatchment 10: WS 10

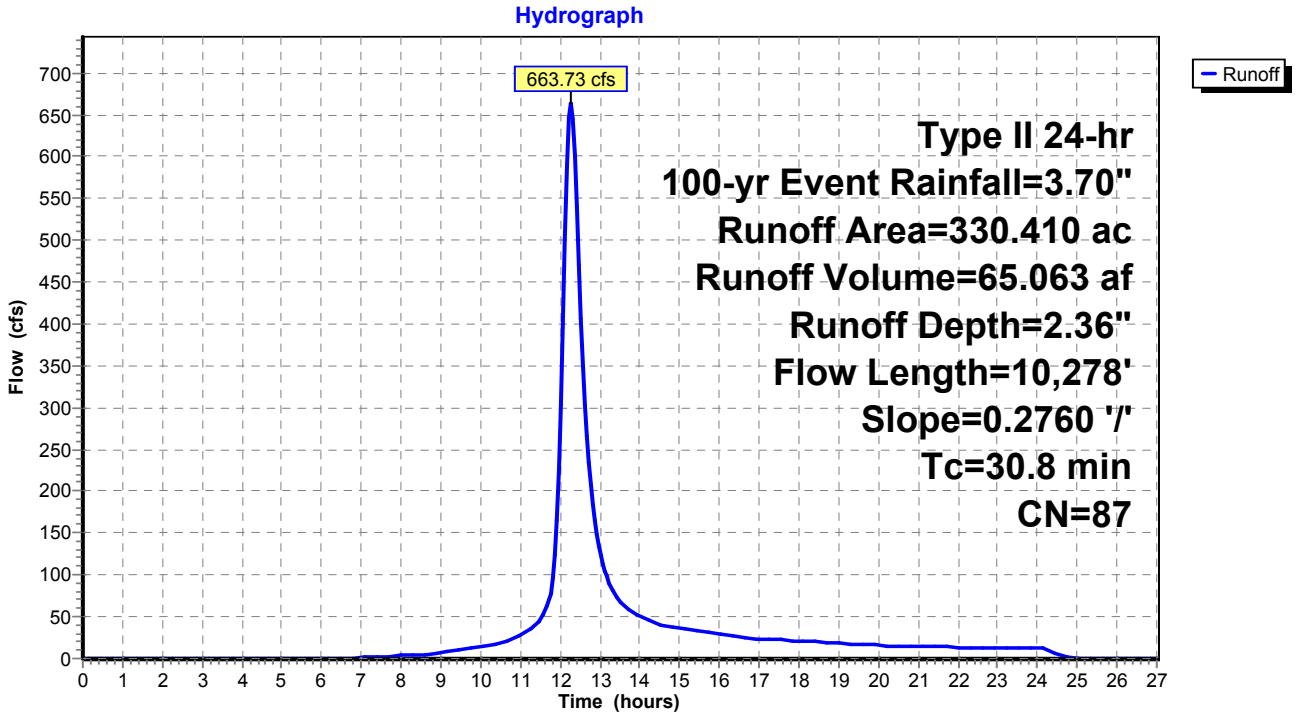
Runoff = 663.73 cfs @ 12.25 hrs, Volume= 65.063 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	297.370	86	Desert shrub range, Fair, HSG D
*	33.040	98	Impervious, HSG D
	330.410	87	Weighted Average
	297.370		90.00% Pervious Area
	33.040		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	10,278	0.2760	5.57		**Lag/CN Method,**

Subcatchment 10: WS 10



Summary for Subcatchment 11: WS 11

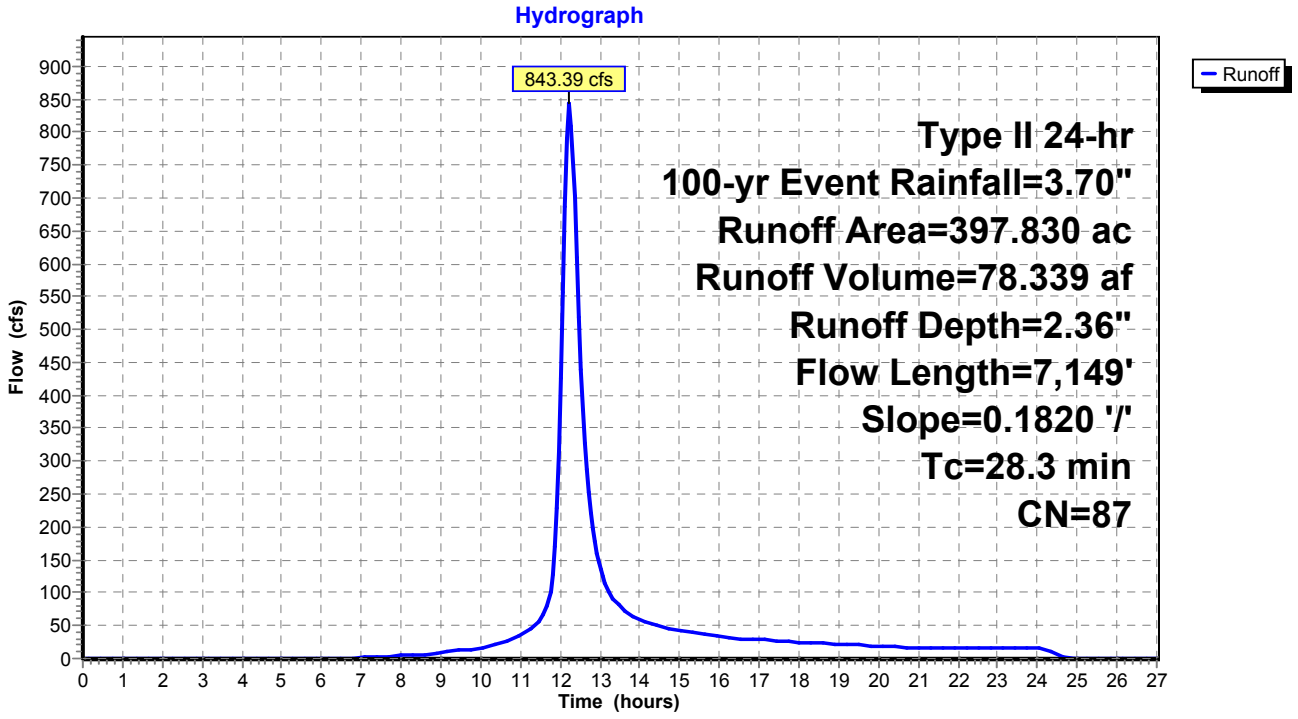
Runoff = 843.39 cfs @ 12.22 hrs, Volume= 78.339 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Summary for Subcatchment 12: WS 12

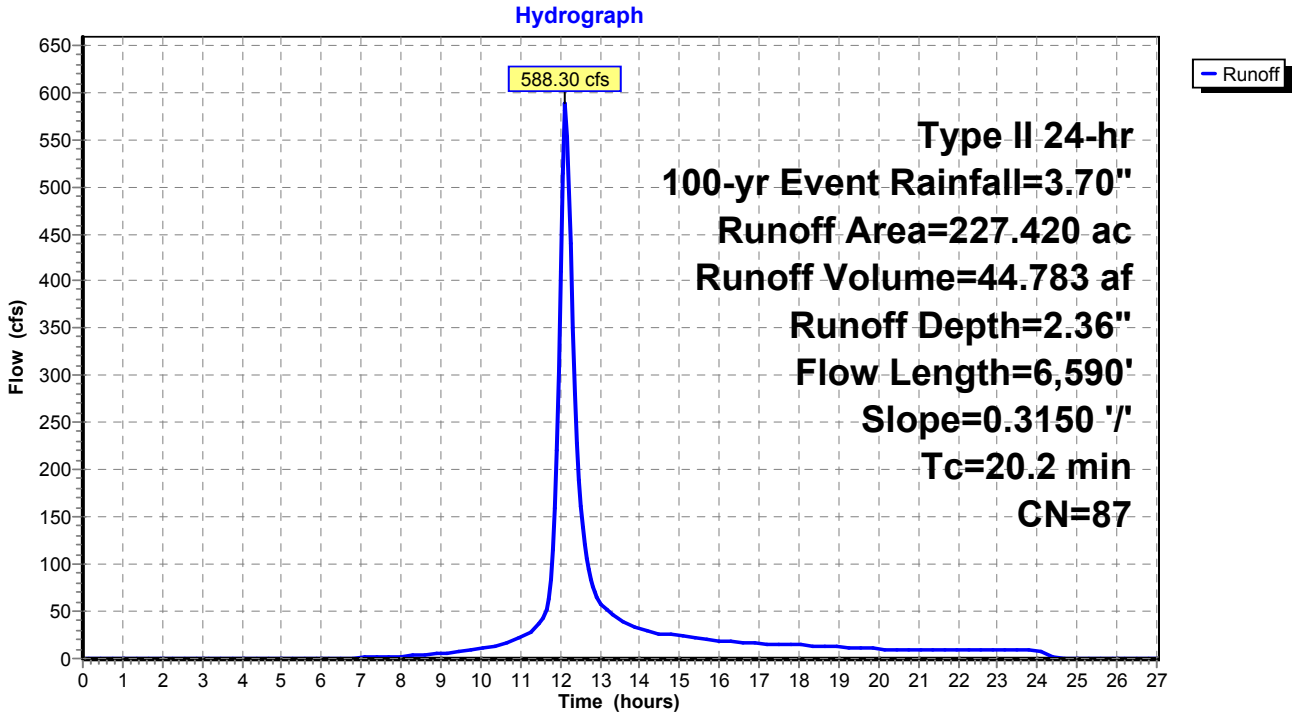
Runoff = 588.30 cfs @ 12.13 hrs, Volume= 44.783 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	204.680	86	Desert shrub range, Fair, HSG D
*	22.740	98	Impervious, HSG D
	227.420	87	Weighted Average
	204.680		90.00% Pervious Area
	22.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	6,590	0.3150	5.44		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

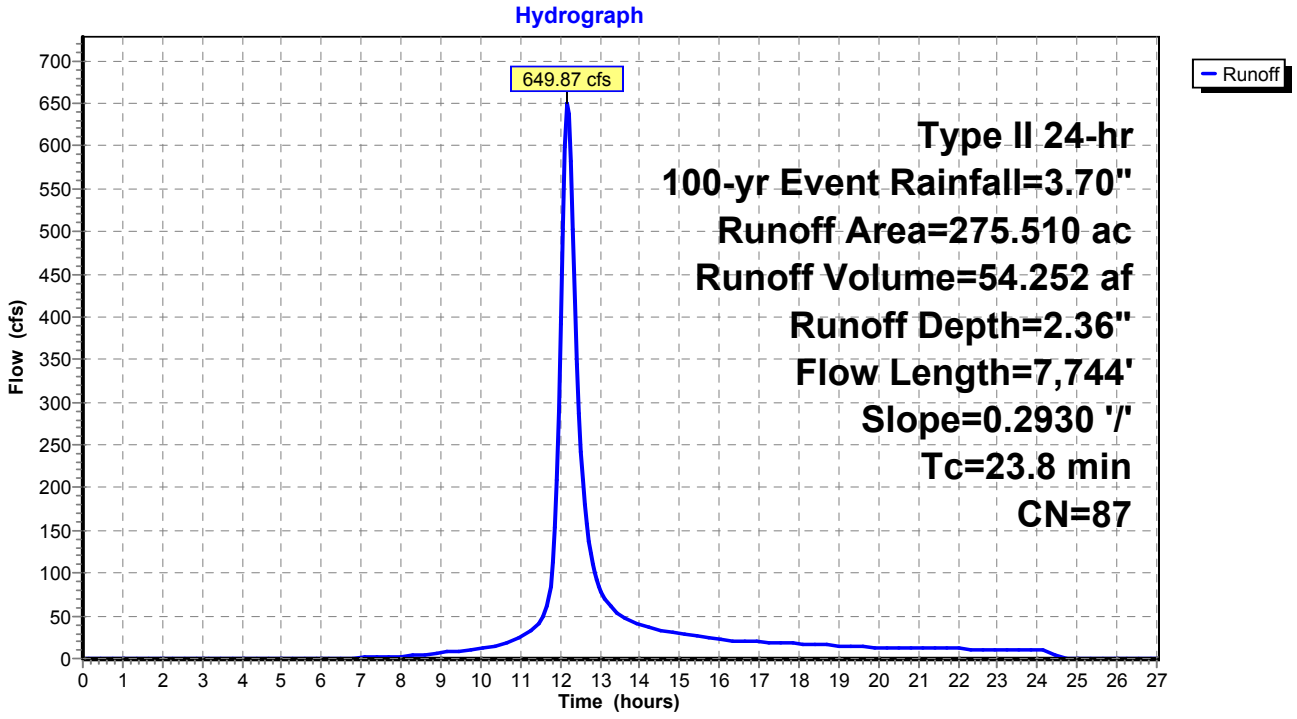
Runoff = 649.87 cfs @ 12.17 hrs, Volume= 54.252 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Event Rainfall=3.70"

	Area (ac)	CN	Description
	247.960	86	Desert shrub range, Fair, HSG D
*	27.550	98	Impervious, HSG D
	275.510	87	Weighted Average
	247.960		90.00% Pervious Area
	27.550		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	7,744	0.2930	5.42		**Lag/CN Method,**

Subcatchment 13: WS 13



Summary for Reach CHNL 1: Channel 1

Inflow Area = 502.930 ac, 10.00% Impervious, Inflow Depth = 2.36" for 100-yr Event event
Inflow = 1,228.49 cfs @ 12.15 hrs, Volume= 99.035 af
Outflow = 1,184.09 cfs @ 12.25 hrs, Volume= 99.033 af, Atten= 4%, Lag= 6.1 min

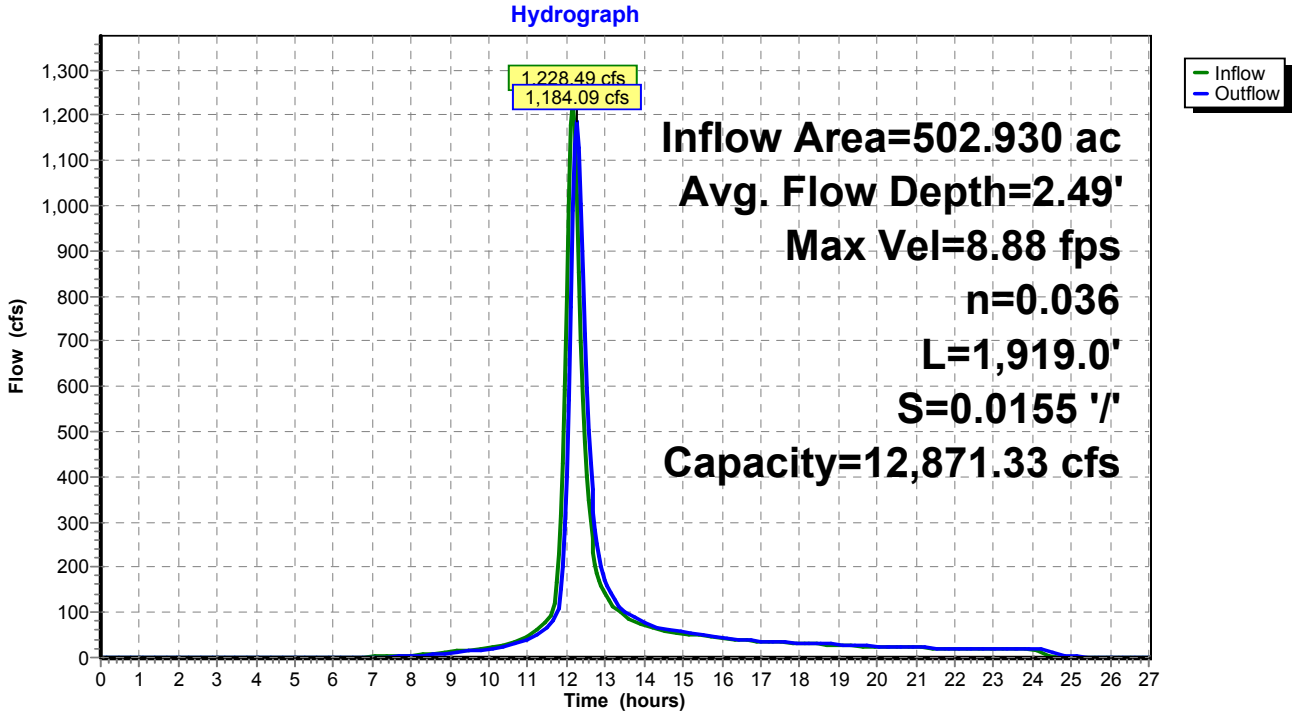
Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.88 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 2.21 fps, Avg. Travel Time= 14.4 min

Peak Storage= 257,291 cf @ 12.19 hrs
Average Depth at Peak Storage= 2.49'
Bank-Full Depth= 10.00' Flow Area= 650.0 sf, Capacity= 12,871.33 cfs

50.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 80.00'
Length= 1,919.0' Slope= 0.0155 '/'
Inlet Invert= 5,569.50', Outlet Invert= 5,539.70'

‡

Reach CHNL 1: Channel 1



Summary for Reach CHNL 2: Channel 2

Inflow Area = 870.220 ac, 10.00% Impervious, Inflow Depth = 2.36" for 100-yr Event event
Inflow = 1,933.74 cfs @ 12.14 hrs, Volume= 171.361 af
Outflow = 1,565.27 cfs @ 12.49 hrs, Volume= 170.940 af, Atten= 19%, Lag= 21.3 min

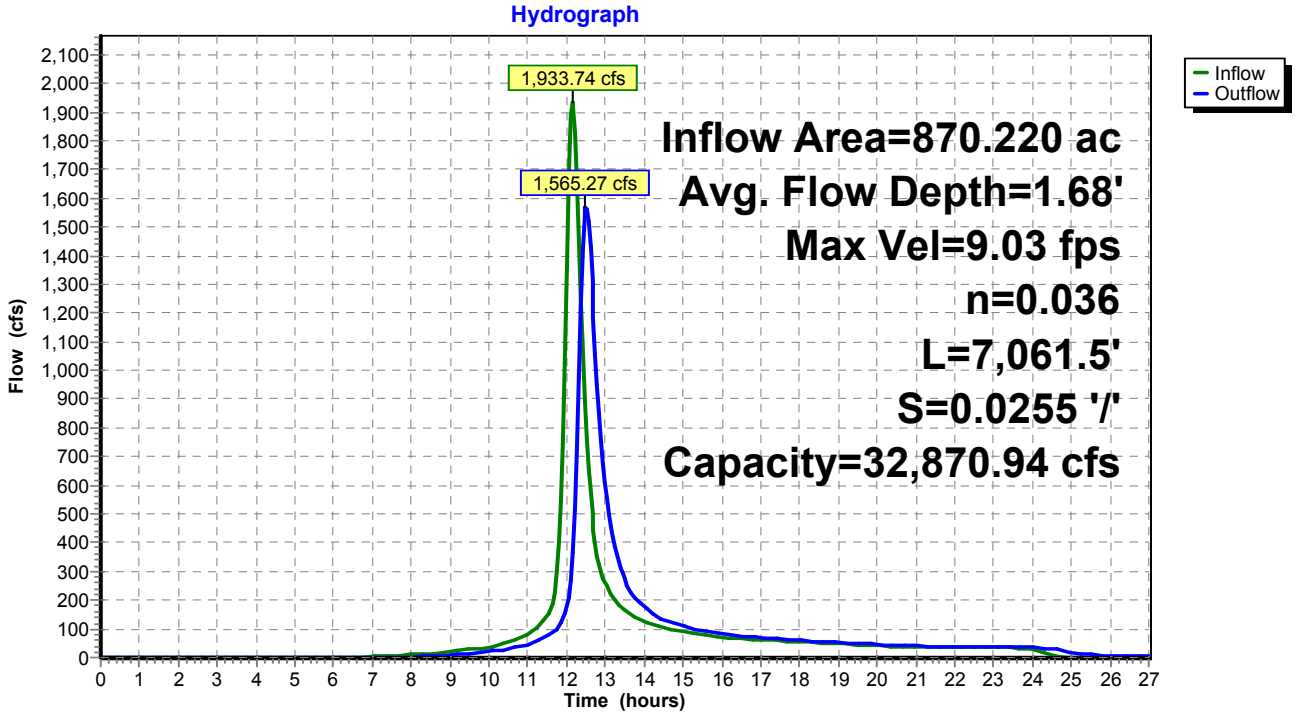
Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.03 fps, Min. Travel Time= 13.0 min
Avg. Velocity = 2.51 fps, Avg. Travel Time= 46.9 min

Peak Storage= 1,228,925 cf @ 12.27 hrs
Average Depth at Peak Storage= 1.68'
Bank-Full Depth= 10.00' Flow Area= 1,225.0 sf, Capacity= 32,870.94 cfs

100.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 2.5 2.0 '/' Top Width= 145.00'
Length= 7,061.5' Slope= 0.0255 '/'
Inlet Invert= 5,720.00', Outlet Invert= 5,539.70'

‡

Reach CHNL 2: Channel 2



Summary for Reach CHNL 3: Channel 3

[62] Hint: Exceeded Reach CHNL 1 OUTLET depth by 3.53' @ 12.45 hrs
[62] Hint: Exceeded Reach CHNL 2 OUTLET depth by 3.70' @ 12.40 hrs

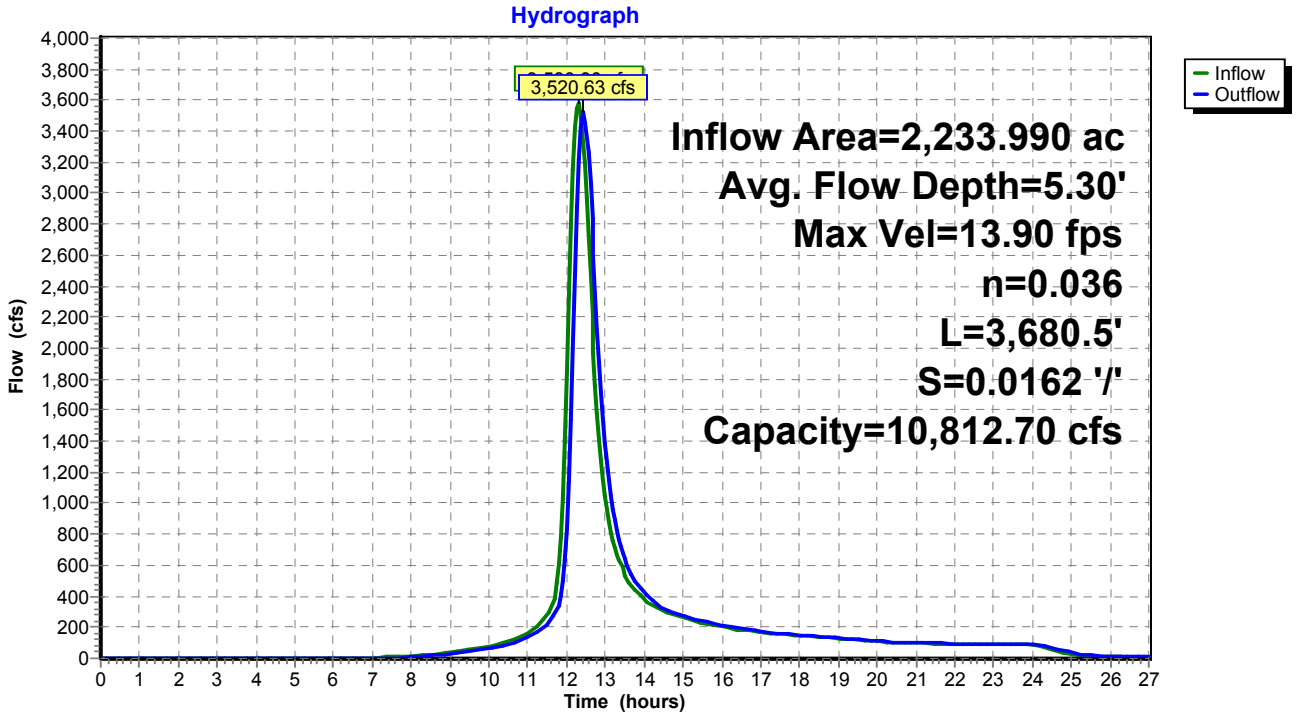
Inflow Area = 2,233.990 ac, 10.00% Impervious, Inflow Depth > 2.36" for 100-yr Event event
Inflow = 3,580.90 cfs @ 12.29 hrs, Volume= 439.487 af
Outflow = 3,520.63 cfs @ 12.42 hrs, Volume= 439.082 af, Atten= 2%, Lag= 7.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.90 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 4.18 fps, Avg. Travel Time= 14.7 min

Peak Storage= 935,003 cf @ 12.35 hrs
Average Depth at Peak Storage= 5.30'
Bank-Full Depth= 10.00' Flow Area= 550.0 sf, Capacity= 10,812.70 cfs

40.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 70.00'
Length= 3,680.5' Slope= 0.0162 '/'
Inlet Invert= 5,539.70', Outlet Invert= 5,480.00'

Reach CHNL 3: Channel 3



Summary for Reach CHNL 4: Channel 4

[61] Hint: Exceeded Reach CHNL 3 outlet invert by 3.72' @ 12.45 hrs

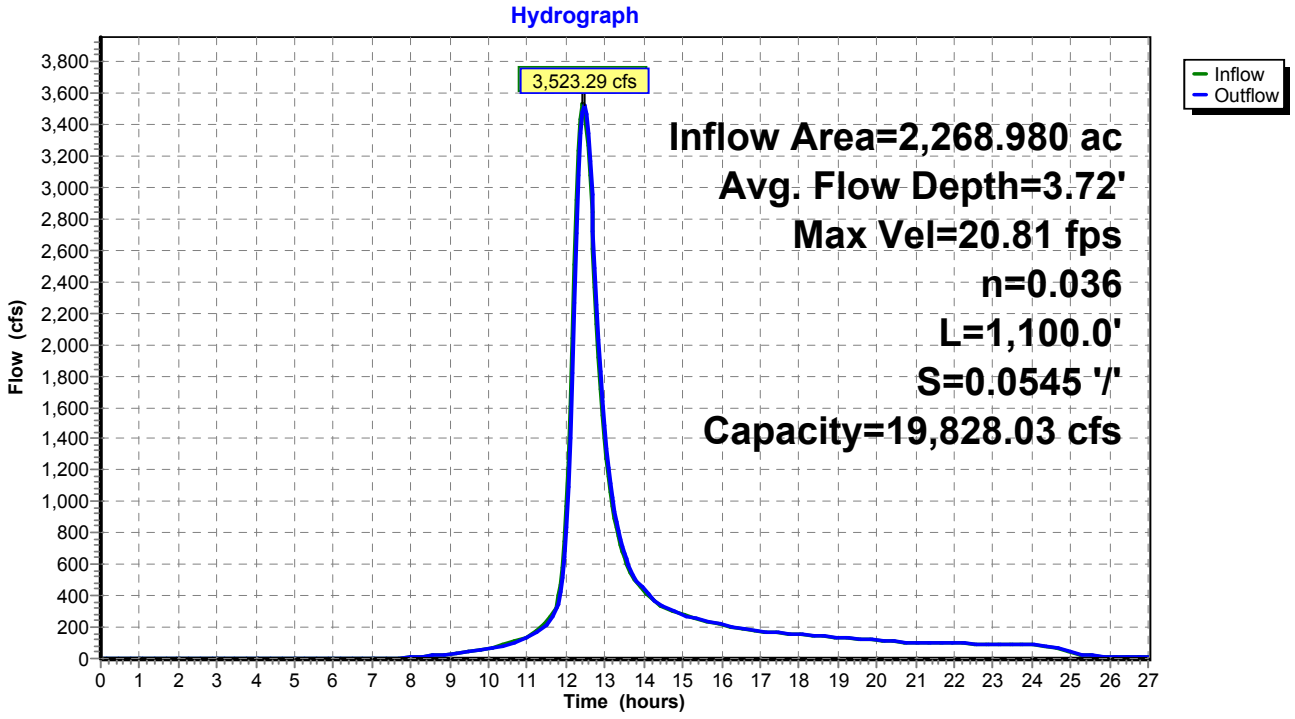
Inflow Area = 2,268.980 ac, 10.00% Impervious, Inflow Depth > 2.36" for 100-yr Event event
Inflow = 3,535.74 cfs @ 12.42 hrs, Volume= 445.972 af
Outflow = 3,523.29 cfs @ 12.45 hrs, Volume= 445.885 af, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 20.81 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 6.18 fps, Avg. Travel Time= 3.0 min

Peak Storage= 186,563 cf @ 12.43 hrs
Average Depth at Peak Storage= 3.72'
Bank-Full Depth= 10.00' Flow Area= 550.0 sf, Capacity= 19,828.03 cfs

40.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 70.00'
Length= 1,100.0' Slope= 0.0545 '/'
Inlet Invert= 5,480.00', Outlet Invert= 5,420.00'

Reach CHNL 4: Channel 4



Summary for Reach CHNL 5: Channel 5

[62] Hint: Exceeded Reach CHNL 4 OUTLET depth by 2.45' @ 12.55 hrs

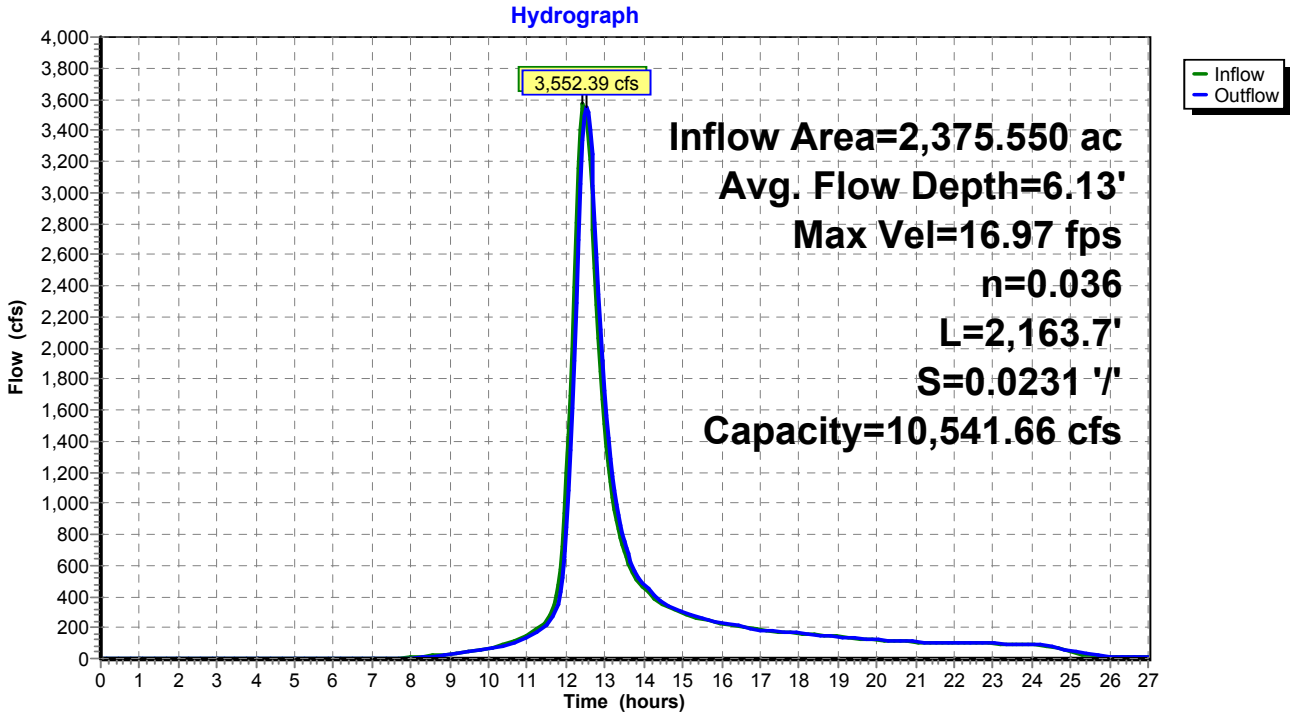
Inflow Area = 2,375.550 ac, 10.00% Impervious, Inflow Depth > 2.36" for 100-yr Event event
Inflow = 3,572.05 cfs @ 12.44 hrs, Volume= 466.870 af
Outflow = 3,552.39 cfs @ 12.51 hrs, Volume= 466.654 af, Atten= 1%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 16.97 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 5.55 fps, Avg. Travel Time= 6.5 min

Peak Storage= 453,859 cf @ 12.47 hrs
Average Depth at Peak Storage= 6.13'
Bank-Full Depth= 11.00' Flow Area= 456.5 sf, Capacity= 10,541.66 cfs

25.00' x 11.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 58.00'
Length= 2,163.7' Slope= 0.0231 '/'
Inlet Invert= 5,420.00', Outlet Invert= 5,370.00'

Reach CHNL 5: Channel 5



Summary for Pond CLVT 1: Culvert Crossing #1

[62] Hint: Exceeded Reach CHNL 5 OUTLET depth by 14.44' @ 12.75 hrs

Inflow Area = 2,375.550 ac, 10.00% Impervious, Inflow Depth > 2.36" for 100-yr Event event
Inflow = 3,552.39 cfs @ 12.51 hrs, Volume= 466.654 af
Outflow = 3,058.70 cfs @ 12.70 hrs, Volume= 466.511 af, Atten= 14%, Lag= 11.4 min
Primary = 3,058.70 cfs @ 12.70 hrs, Volume= 466.511 af

Routing by Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 5,389.78' @ 12.70 hrs Surf.Area= 0 sf Storage= 1,214,495 cf
Flood Elev= 5,419.00' Surf.Area= 0 sf Storage= 12,108,960 cf

Plug-Flow detention time= 3.5 min calculated for 465.649 af (100% of inflow)
Center-of-Mass det. time= 3.3 min (865.7 - 862.5)

Volume	Invert	Avail.Storage	Storage Description
#1	5,370.00'	12,108,960 cf	**Culvert Crossing #1** Listed below

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

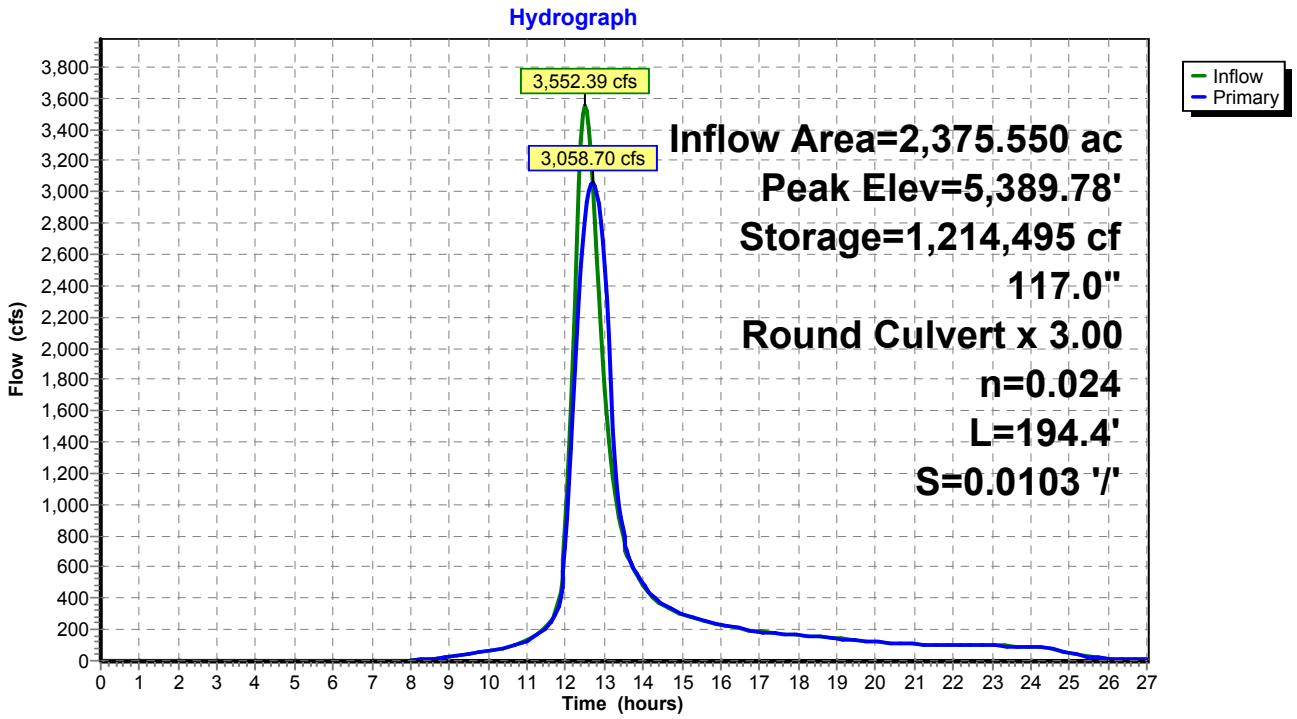
Elevation (feet)	Cum.Store (cubic-feet)
5,370.00	0
5,371.00	1,264
5,372.00	4,909
5,373.00	7,513
5,374.00	16,645
5,375.00	29,237
5,376.00	46,725
5,377.00	71,156
5,378.00	103,816
5,379.00	144,375
5,380.00	193,809
5,381.00	252,611
5,382.00	321,098
5,383.00	399,998
5,384.00	488,627
5,385.00	587,544
5,386.00	697,578
5,387.00	818,723
5,388.00	950,841
5,389.00	1,094,170
5,390.00	1,248,216
5,391.00	1,412,011
5,392.00	1,587,481
5,393.00	1,774,410
5,394.00	1,971,598
5,395.00	2,046,356
5,396.00	2,266,171
5,397.00	2,498,604
5,398.00	2,742,207
5,399.00	2,998,577
5,400.00	3,272,610
5,401.00	3,564,605
5,402.00	3,875,249
5,403.00	4,205,411
5,404.00	4,554,001
5,405.00	4,921,330
5,406.00	5,306,733
5,407.00	5,710,058
5,408.00	6,132,117
5,409.00	6,572,849
5,410.00	7,032,579
5,411.00	7,512,479
5,412.00	8,012,116
5,413.00	8,533,107
5,414.00	9,078,172
5,415.00	9,647,155
5,416.00	10,235,642
5,417.00	10,841,380
5,418.00	11,465,162
5,419.00	12,108,960

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

Device	Routing	Invert	Outlet Devices
#1	Primary	5,372.00'	**117.0" Round Culvert X 3.00** L= 194.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5,372.00' / 5,370.00' S= 0.0103 '/' Cc= 0.900 n= 0.024, Flow Area= 74.66 sf

Primary OutFlow Max=3,057.57 cfs @ 12.70 hrs HW=5,389.77' (Free Discharge)
1=Culvert (Inlet Controls 3,057.57 cfs @ 13.65 fps)

Pond CLVT 1: Culvert Crossing #1



Summary for Pond CLVT 2: Culvert Crossing #2

[81] Warning: Exceeded Pond CLVT 1 by 7.40' @ 13.35 hrs

Inflow Area = 2,403.760 ac, 10.00% Impervious, Inflow Depth > 2.36" for 100-yr Event event
Inflow = 3,066.00 cfs @ 12.70 hrs, Volume= 472.066 af
Outflow = 1,545.71 cfs @ 13.19 hrs, Volume= 472.015 af, Atten= 50%, Lag= 29.9 min
Primary = 1,545.71 cfs @ 13.19 hrs, Volume= 472.015 af

Routing by Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 5,386.54' @ 13.19 hrs Surf.Area= 0 sf Storage= 5,175,763 cf
Flood Elev= 5,403.00' Surf.Area= 0 sf Storage= 10,142,539 cf

Plug-Flow detention time= 26.2 min calculated for 471.143 af (100% of inflow)
Center-of-Mass det. time= 26.0 min (891.1 - 865.1)

Volume	Invert	Avail.Storage	Storage Description
#1	5,352.00'	10,142,539 cf	**Existing Pond** Listed below

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 100-yr Event Rainfall=3.70"*
Prepared by M3 Engineering Printed 11/24/2015

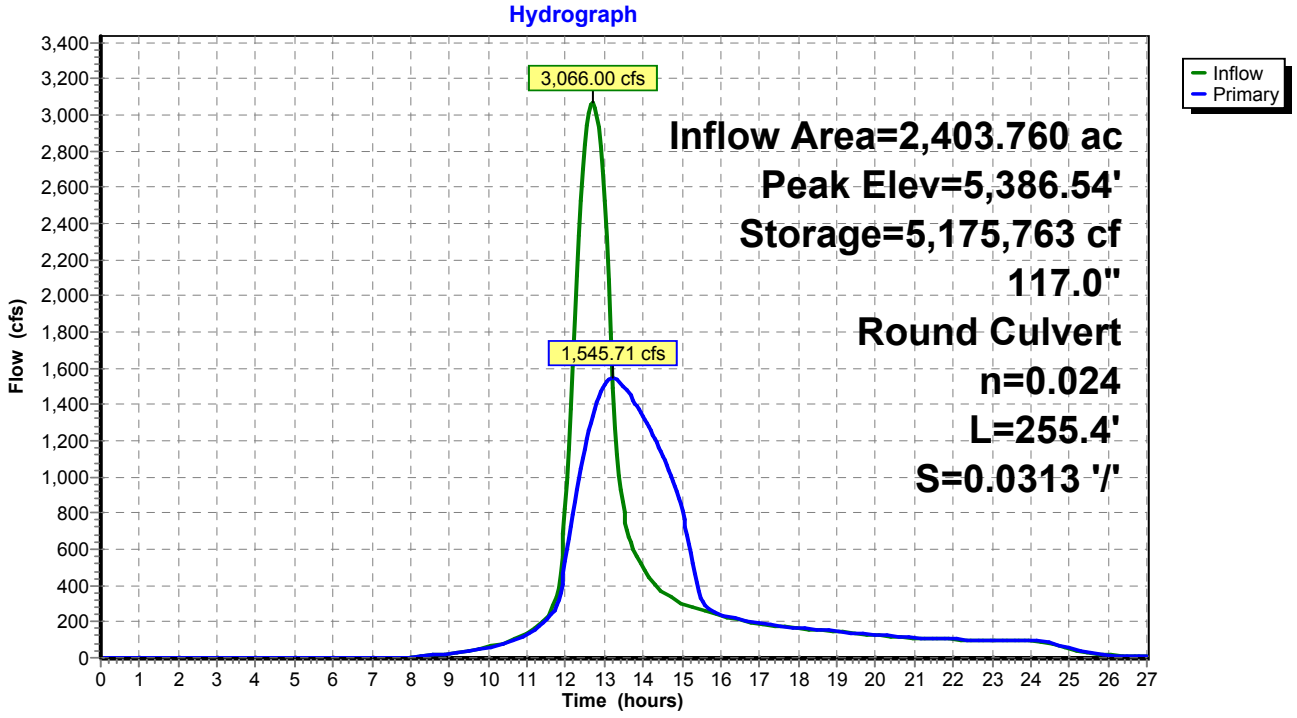
Elevation (feet)	Cum.Store (cubic-feet)
5,352.00	0
5,353.00	2,681
5,354.00	7,382
5,355.00	15,397
5,356.00	28,286
5,357.00	47,224
5,358.00	75,773
5,359.00	117,133
5,360.00	170,345
5,361.00	235,331
5,362.00	312,331
5,363.00	399,765
5,364.00	497,494
5,365.00	605,663
5,366.00	724,610
5,367.00	855,928
5,368.00	1,000,315
5,369.00	1,157,122
5,370.00	1,325,832
5,371.00	1,505,243
5,372.00	1,693,878
5,373.00	1,890,808
5,374.00	2,095,234
5,375.00	2,306,959
5,376.00	2,525,755
5,377.00	2,751,367
5,378.00	2,983,426
5,379.00	3,221,478
5,380.00	3,465,168
5,381.00	3,714,247
5,382.00	3,968,434
5,383.00	4,227,291
5,384.00	4,490,405
5,385.00	4,757,518
5,386.00	5,028,418
5,387.00	5,302,894
5,388.00	5,580,732
5,389.00	5,861,867
5,390.00	6,146,219
5,391.00	6,433,776
5,392.00	6,724,543
5,393.00	7,018,534
5,394.00	7,315,762
5,395.00	7,616,273
5,396.00	7,920,106
5,397.00	8,227,290
5,398.00	8,537,855
5,399.00	8,851,826
5,400.00	9,169,229
5,401.00	9,490,117

5,402.00	9,814,540
5,403.00	10,142,539

Device	Routing	Invert	Outlet Devices
#1	Primary	5,352.00'	**117.0" Round Culvert** L= 255.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5,352.00' / 5,344.00' S= 0.0313 '/' Cc= 0.900 n= 0.024, Flow Area= 74.66 sf

Primary OutFlow Max=1,545.45 cfs @ 13.19 hrs HW=5,386.53' (Free Discharge)
└**1=Culvert** (Inlet Controls 1,545.45 cfs @ 20.70 fps)

Pond CLVT 2: Culvert Crossing #2



Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=28.210 ac 10.00% Impervious Runoff Depth=2.72"
Tc=5.0 min CN=87 Runoff=133.97 cfs 6.393 af

Subcatchment2: WS 2 Runoff Area=106.570 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,068' Slope=0.3140 '/' Tc=11.0 min CN=87 Runoff=415.35 cfs 24.150 af

Subcatchment3: WS 3 Runoff Area=34.990 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=1,603' Slope=0.1770 '/' Tc=8.7 min CN=87 Runoff=148.20 cfs 7.929 af

Subcatchment4: WS 4 Runoff Area=75.020 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,047' Slope=0.3390 '/' Tc=10.5 min CN=87 Runoff=297.56 cfs 17.000 af

Subcatchment5: WS 5 Runoff Area=124.190 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=5,976' Slope=0.3400 '/' Tc=18.0 min CN=87 Runoff=392.70 cfs 28.143 af

Subcatchment6: WS 6 Runoff Area=331.220 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=8,173' Slope=0.3100 '/' Tc=24.2 min CN=87 Runoff=888.50 cfs 75.058 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=5,064' Slope=0.2960 '/' Tc=16.9 min CN=87 Runoff=471.20 cfs 32.739 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=334.29 cfs 20.851 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=651.70 cfs 53.460 af

Subcatchment10: WS 10 Runoff Area=330.410 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=10,278' Slope=0.2760 '/' Tc=30.8 min CN=87 Runoff=762.30 cfs 74.875 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=968.42 cfs 90.153 af

Subcatchment12: WS 12 Runoff Area=227.420 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=6,590' Slope=0.3150 '/' Tc=20.2 min CN=87 Runoff=674.80 cfs 51.536 af

Subcatchment13: WS 13 Runoff Area=275.510 ac 10.00% Impervious Runoff Depth=2.72"
Flow Length=7,744' Slope=0.2930 '/' Tc=23.8 min CN=87 Runoff=745.85 cfs 62.434 af

Reach CHNL 1: Channel 1 Avg. Flow Depth=2.71' Max Vel=9.34 fps Inflow=1,409.59 cfs 113.970 af
n=0.036 L=1,919.0' S=0.0155 '/' Capacity=12,871.33 cfs Outflow=1,364.28 cfs 113.968 af

Reach CHNL 2: Channel 2 Avg. Flow Depth=1.84' Max Vel=9.59 fps Inflow=2,220.40 cfs 197.202 af
n=0.036 L=7,061.5' S=0.0255 '/' Capacity=32,870.94 cfs Outflow=1,835.68 cfs 196.763 af

Reach CHNL 3: Channel 3 Avg. Flow Depth=5.83' Max Vel=14.67 fps Inflow=4,230.35 cfs 505.807 af
n=0.036 L=3,680.5' S=0.0162 '/' Capacity=10,812.70 cfs Outflow=4,159.08 cfs 505.394 af

Reach CHNL 4: Channel 4 Avg. Flow Depth=4.10' Max Vel=22.02 fps Inflow=4,176.49 cfs 513.323 af
n=0.036 L=1,100.0' S=0.0545 '/' Capacity=19,828.03 cfs Outflow=4,160.94 cfs 513.234 af

Reach CHNL 5: Channel 5 Avg. Flow Depth=6.72' Max Vel=17.83 fps Inflow=4,217.67 cfs 537.384 af
n=0.036 L=2,163.7' S=0.0231 '/' Capacity=10,541.66 cfs Outflow=4,191.95 cfs 537.163 af

Pond CLVT 1: Culvert Crossing Peak Elev=5,392.92' Storage=1,758,861 cf Inflow=4,191.95 cfs 537.163 af
117.0" Round Culvert x 3.00 n=0.024 L=194.4' S=0.0103 '/' Outflow=3,410.14 cfs 537.020 af

Pond CLVT 2: Culvert Crossing Peak Elev=5,391.04' Storage=6,444,314 cf Inflow=3,418.33 cfs 543.413 af
117.0" Round Culvert n=0.024 L=255.4' S=0.0313 '/' Outflow=1,658.81 cfs 543.361 af

Total Runoff Area = 2,403.760 ac Runoff Volume = 544.720 af Average Runoff Depth = 2.72"
90.00% Pervious = 2,163.390 ac 10.00% Impervious = 240.370 ac

Summary for Subcatchment 1: WS 1

[49] Hint: Tc<2dt may require smaller dt

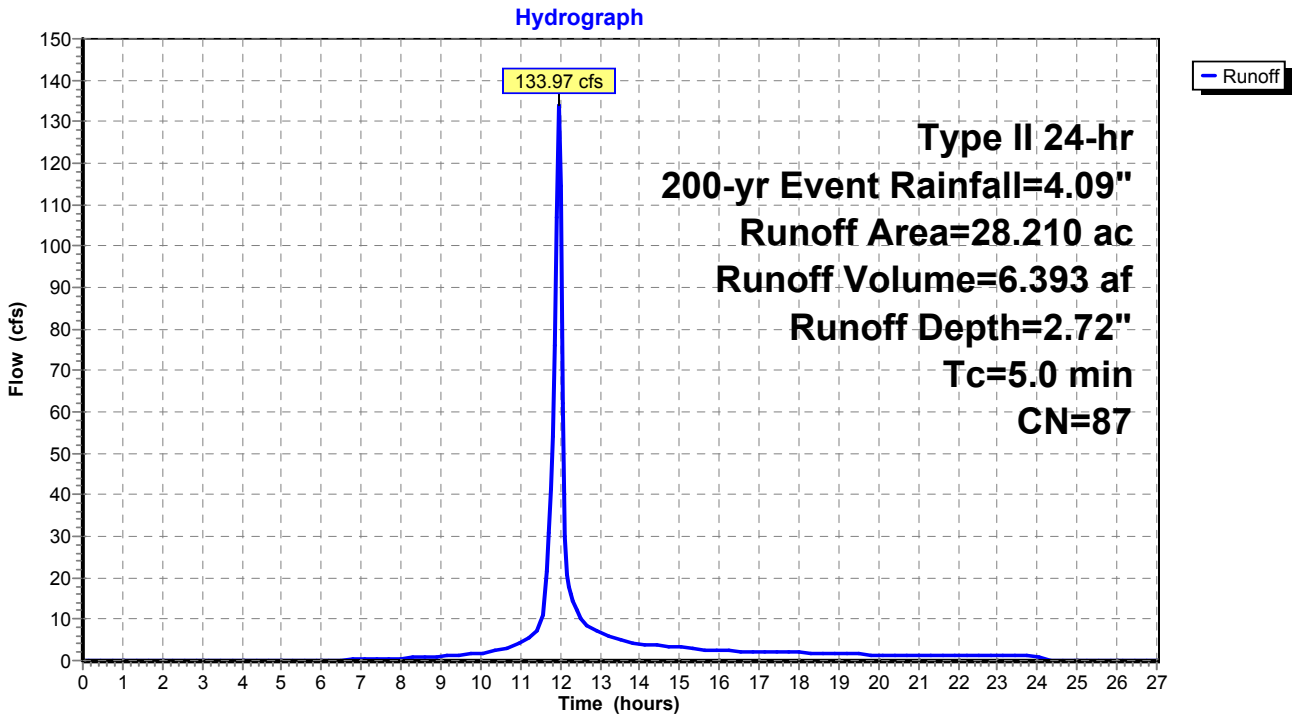
Runoff = 133.97 cfs @ 11.95 hrs, Volume= 6.393 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	25.390	86	Desert shrub range, Fair, HSG D
*	2.820	98	Impervious, HSG D
	28.210	87	Weighted Average
	25.390		90.00% Pervious Area
	2.820		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment 1: WS 1



Summary for Subcatchment 2: WS 2

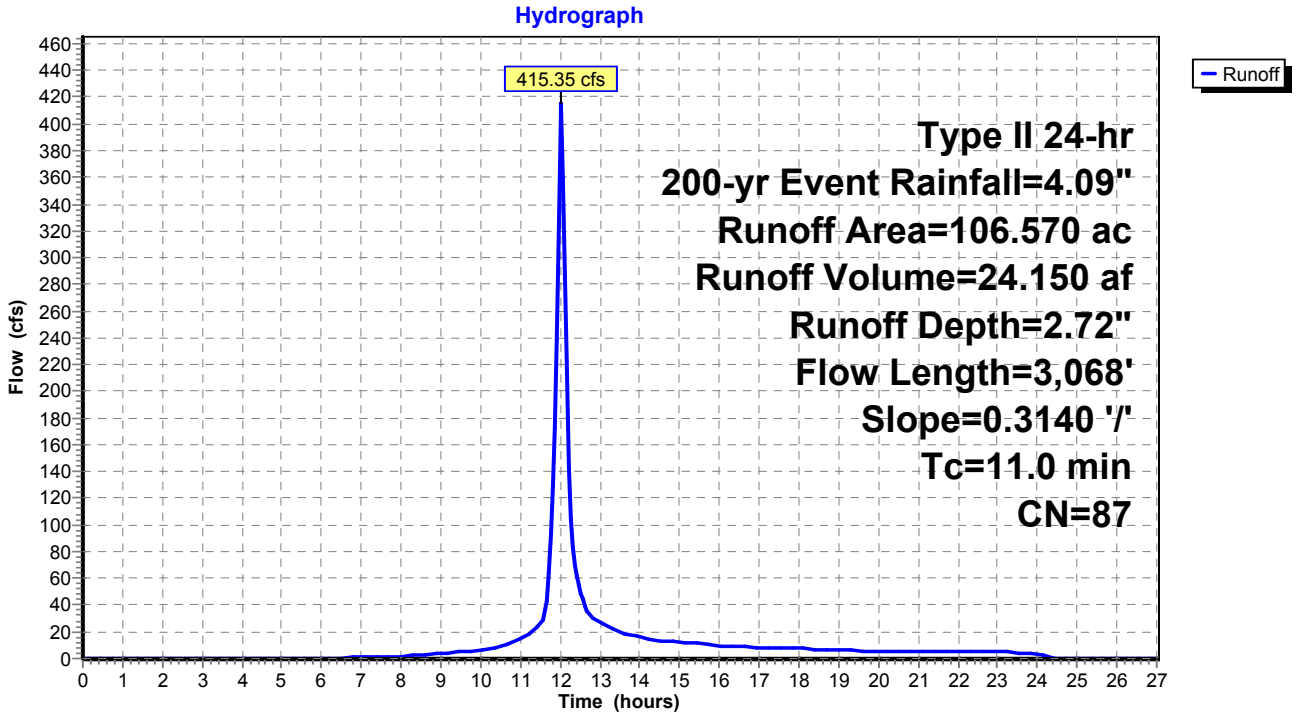
Runoff = 415.35 cfs @ 12.02 hrs, Volume= 24.150 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	95.910	86	Desert shrub range, Fair, HSG D
*	10.660	98	Impervious, HSG D
	106.570	87	Weighted Average
	95.910		90.00% Pervious Area
	10.660		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	3,068	0.3140	4.66		**Lag/CN Method,**

Subcatchment 2: WS 2



Summary for Subcatchment 3: WS 3

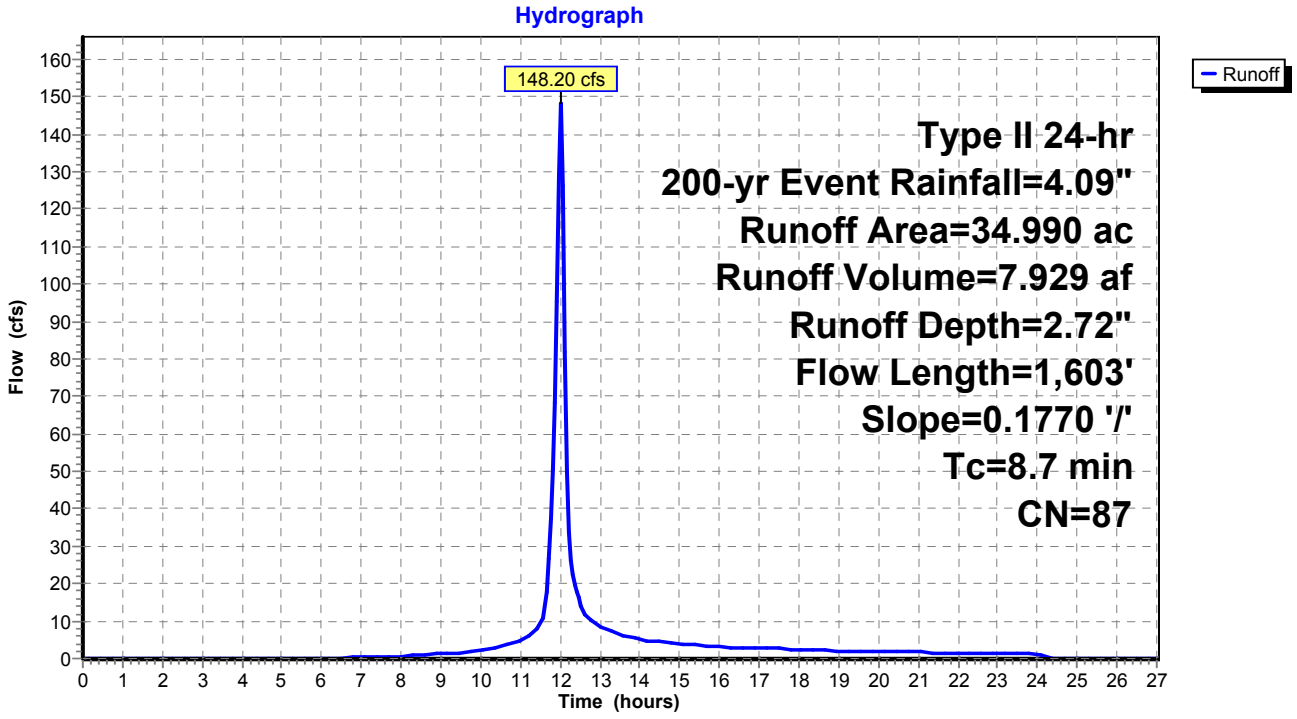
Runoff = 148.20 cfs @ 12.00 hrs, Volume= 7.929 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	31.490	86	Desert shrub range, Fair, HSG D
*	3.500	98	Impervious, HSG D
	34.990	87	Weighted Average
	31.490		90.00% Pervious Area
	3.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	1,603	0.1770	3.07		**Lag/CN Method,**

Subcatchment 3: WS 3



Summary for Subcatchment 4: WS 4

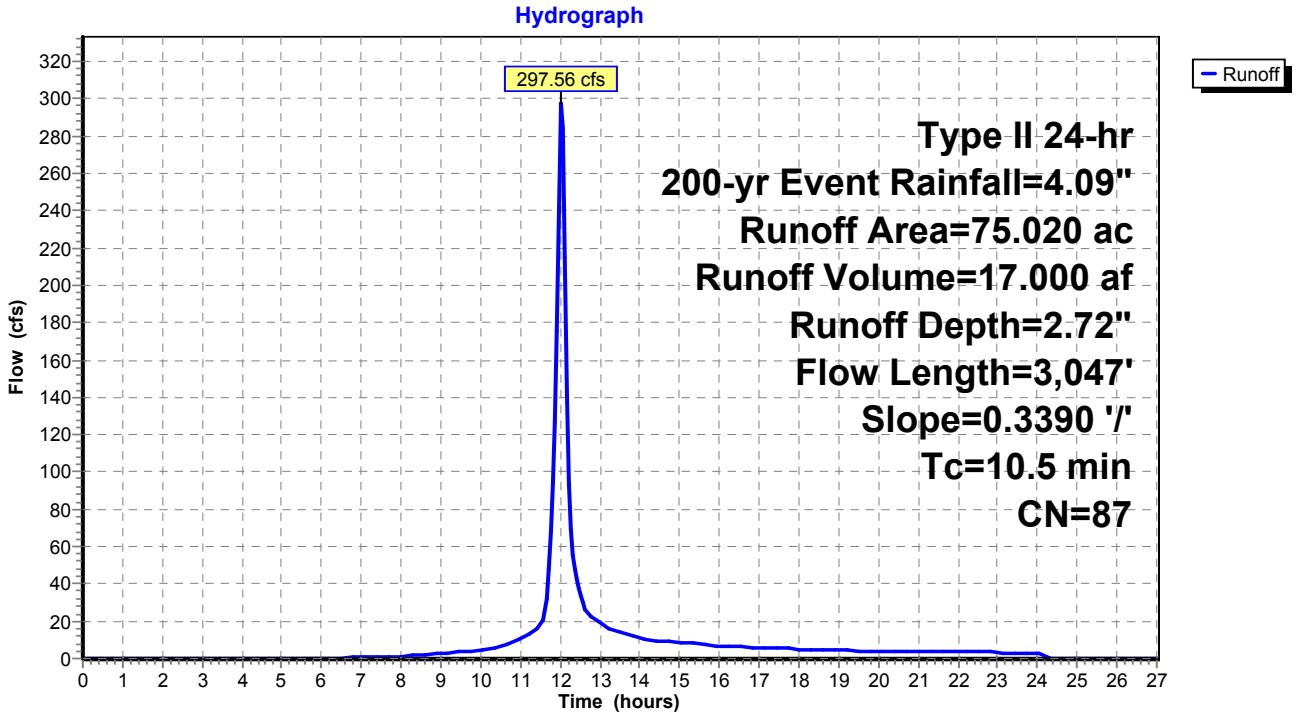
Runoff = 297.56 cfs @ 12.02 hrs, Volume= 17.000 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	67.520	86	Desert shrub range, Fair, HSG D
*	7.500	98	Impervious, HSG D
	75.020	87	Weighted Average
	67.520		90.00% Pervious Area
	7.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	3,047	0.3390	4.84		**Lag/CN Method,**

Subcatchment 4: WS 4



Summary for Subcatchment 5: WS 5

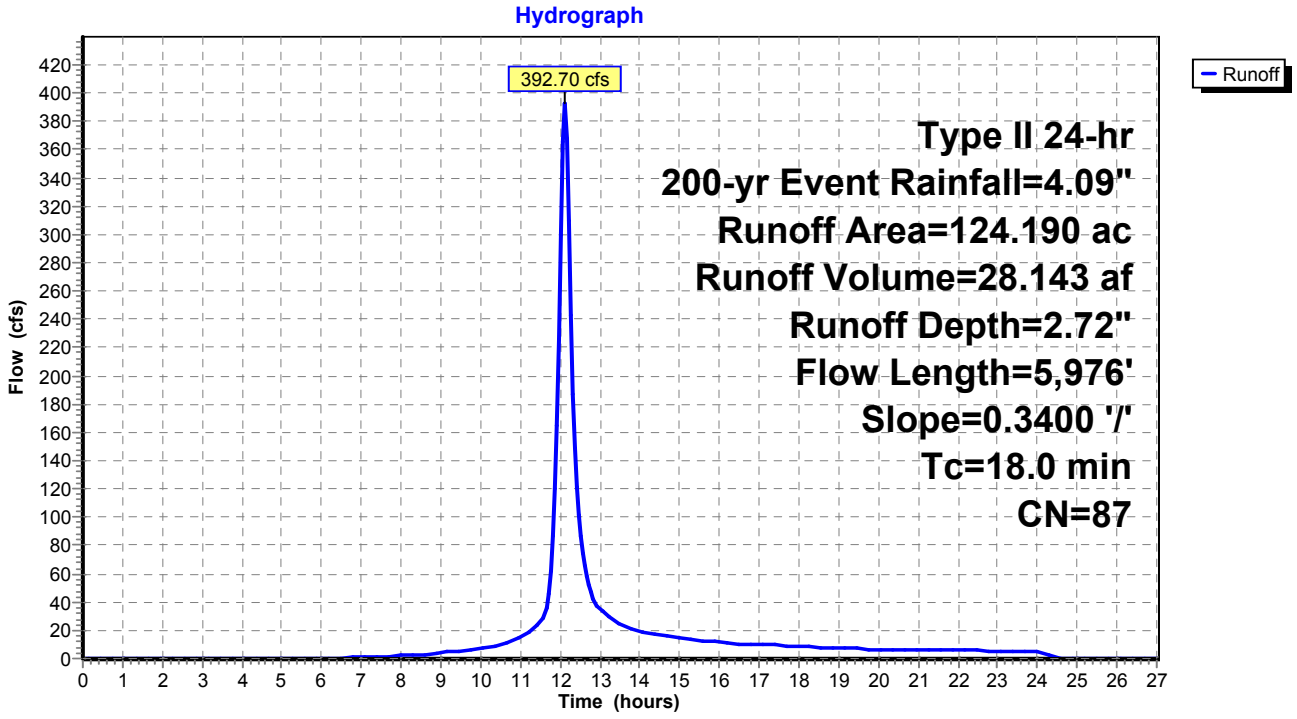
Runoff = 392.70 cfs @ 12.10 hrs, Volume= 28.143 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	111.770	86	Desert shrub range, Fair, HSG D
*	12.420	98	Impervious, HSG D
	124.190	87	Weighted Average
	111.770		90.00% Pervious Area
	12.420		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	5,976	0.3400	5.54		**Lag/CN Method,**

Subcatchment 5: WS 5



Summary for Subcatchment 6: WS 6

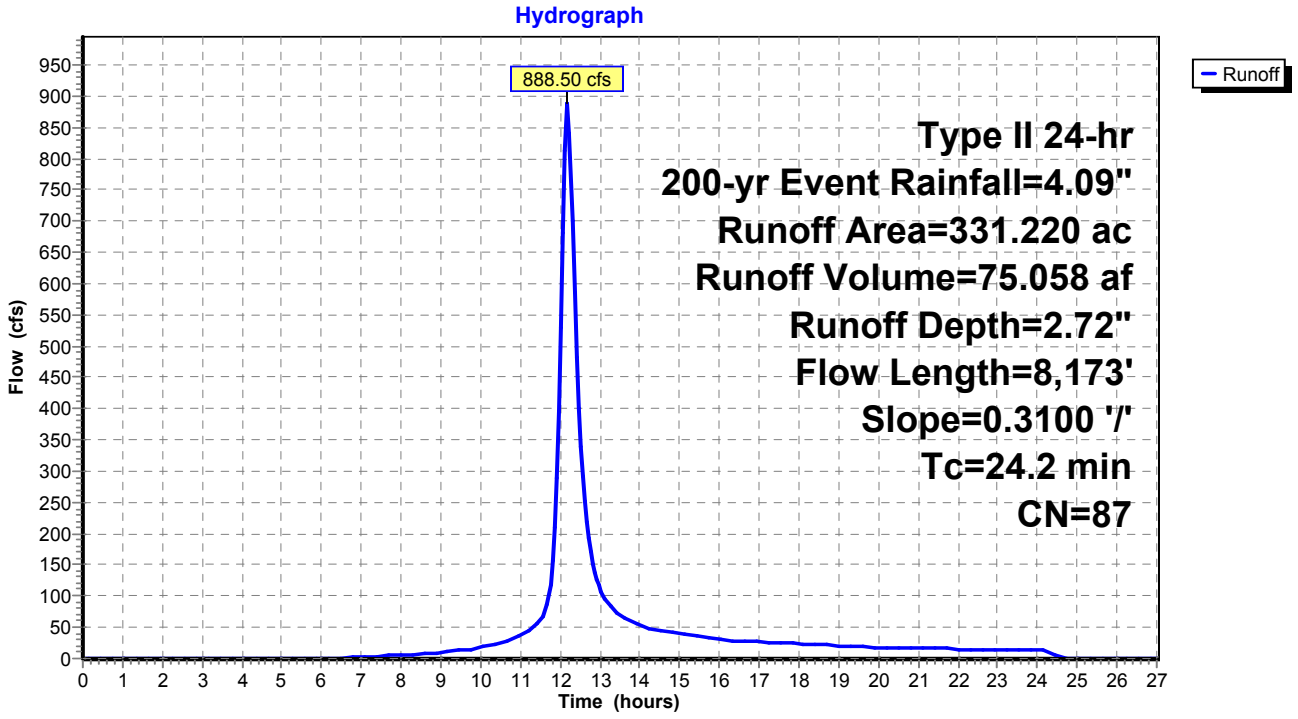
Runoff = 888.50 cfs @ 12.17 hrs, Volume= 75.058 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	298.100	86	Desert shrub range, Fair, HSG D
*	33.120	98	Impervious, HSG D
	331.220	87	Weighted Average
	298.100		90.00% Pervious Area
	33.120		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	8,173	0.3100	5.64		**Lag/CN Method,**

Subcatchment 6: WS 6



Summary for Subcatchment 7: WS 7

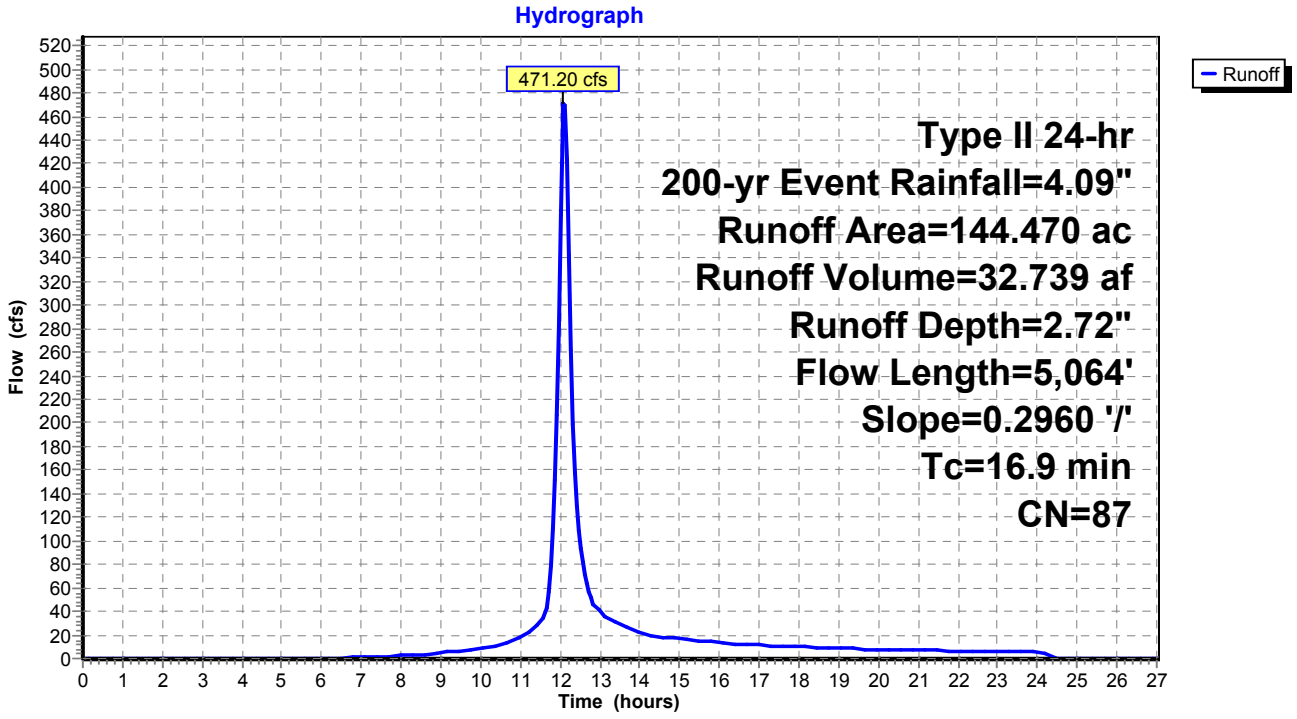
Runoff = 471.20 cfs @ 12.09 hrs, Volume= 32.739 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	5,064	0.2960	5.00		**Lag/CN Method,**

Subcatchment 7: WS 7



Summary for Subcatchment 8: WS 8

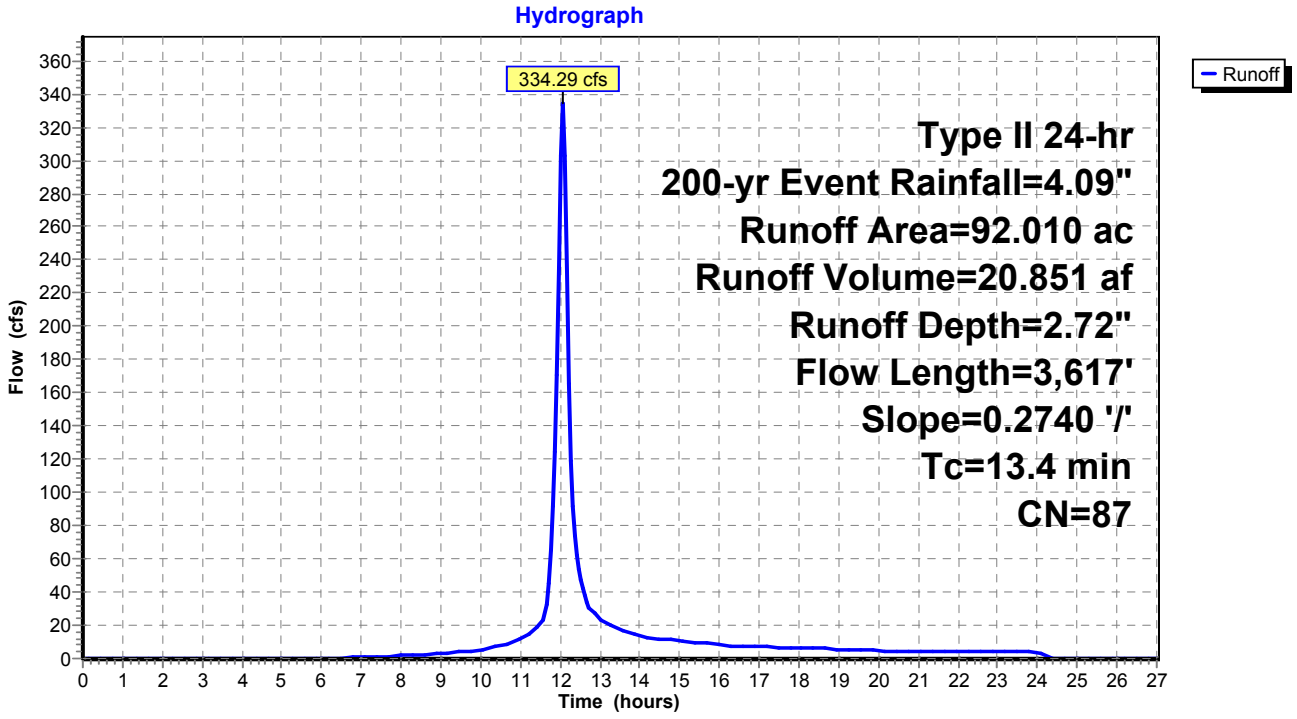
Runoff = 334.29 cfs @ 12.05 hrs, Volume= 20.851 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

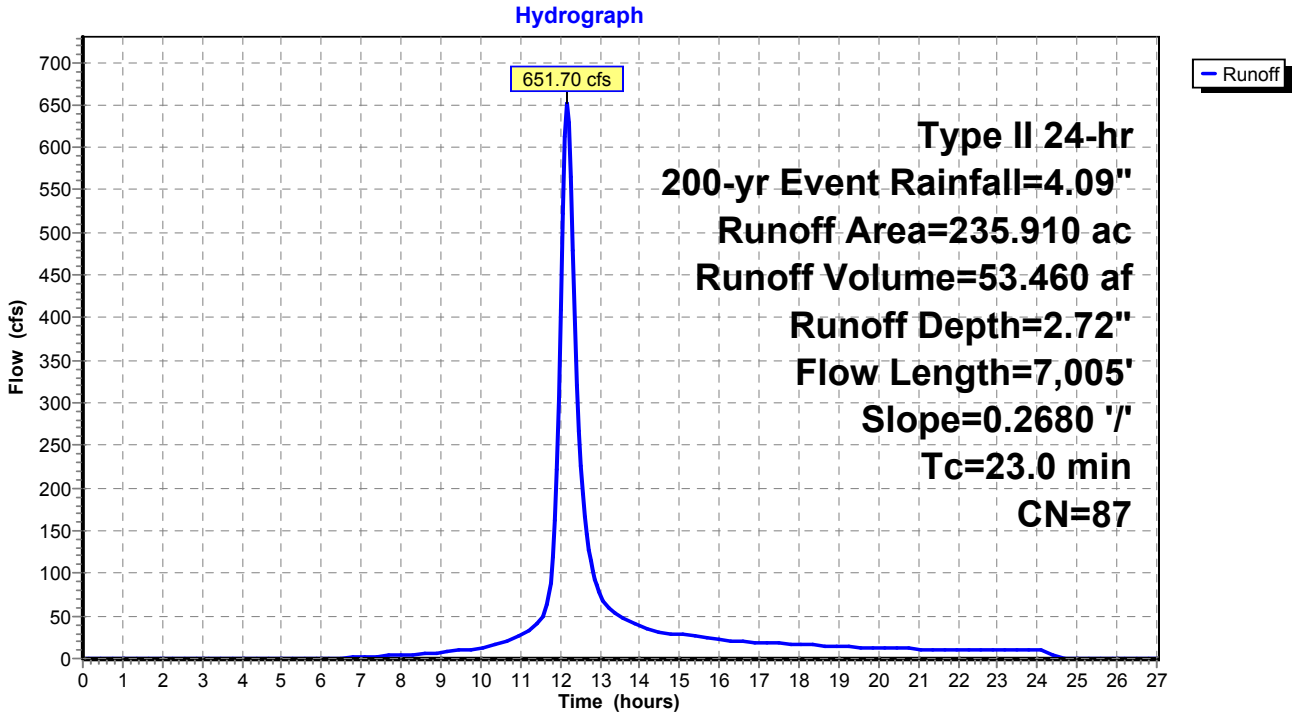
Runoff = 651.70 cfs @ 12.16 hrs, Volume= 53.460 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Summary for Subcatchment 10: WS 10

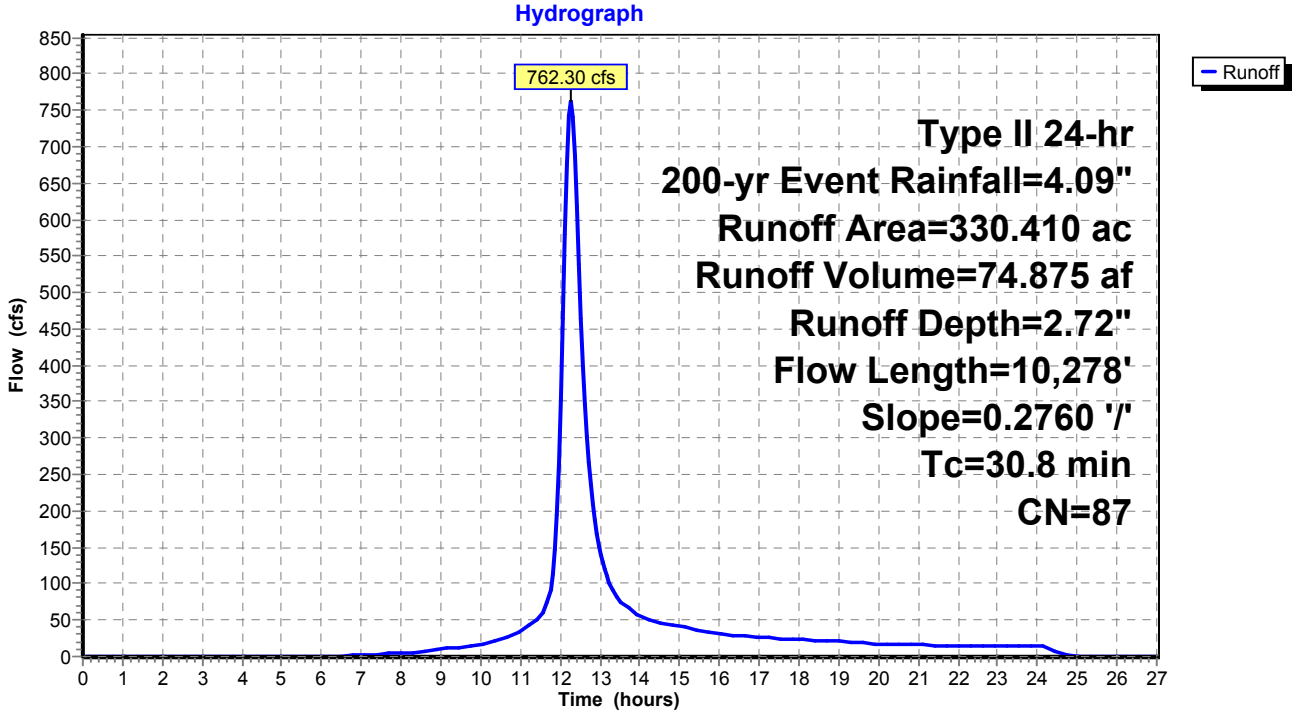
Runoff = 762.30 cfs @ 12.25 hrs, Volume= 74.875 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	297.370	86	Desert shrub range, Fair, HSG D
*	33.040	98	Impervious, HSG D
	330.410	87	Weighted Average
	297.370		90.00% Pervious Area
	33.040		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	10,278	0.2760	5.57		**Lag/CN Method,**

Subcatchment 10: WS 10



Summary for Subcatchment 11: WS 11

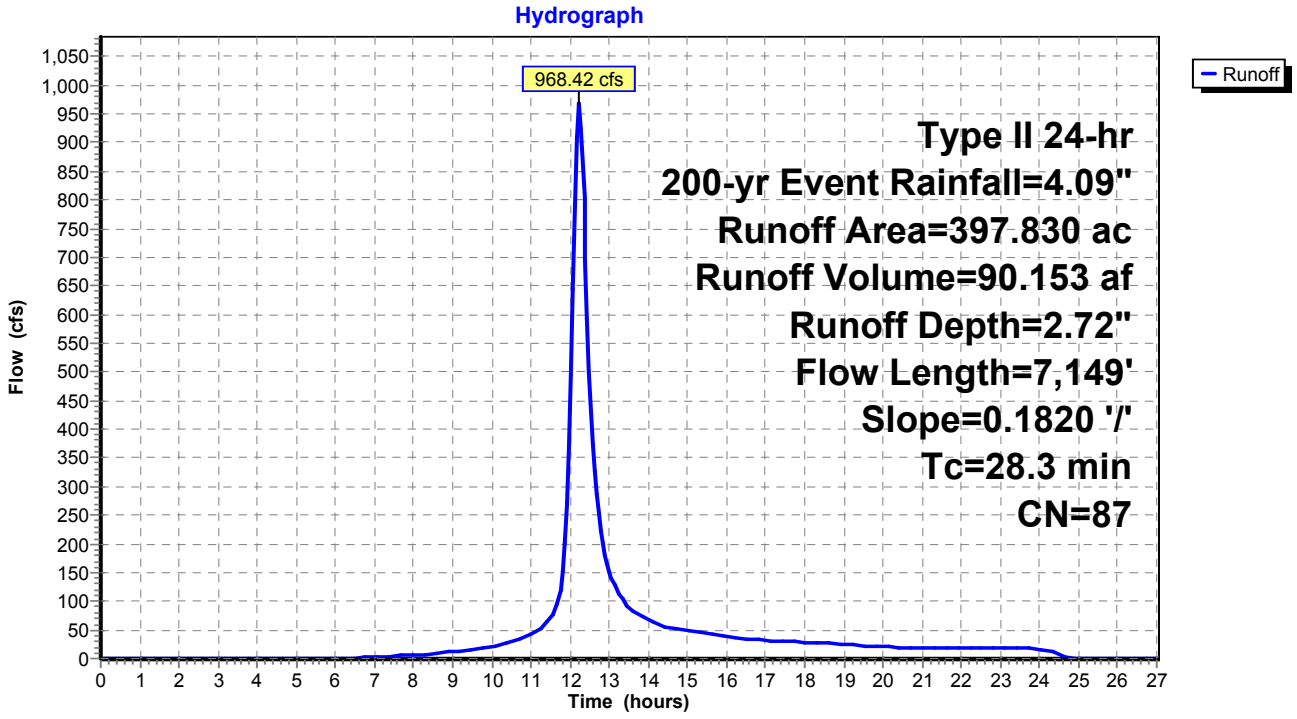
Runoff = 968.42 cfs @ 12.22 hrs, Volume= 90.153 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Summary for Subcatchment 12: WS 12

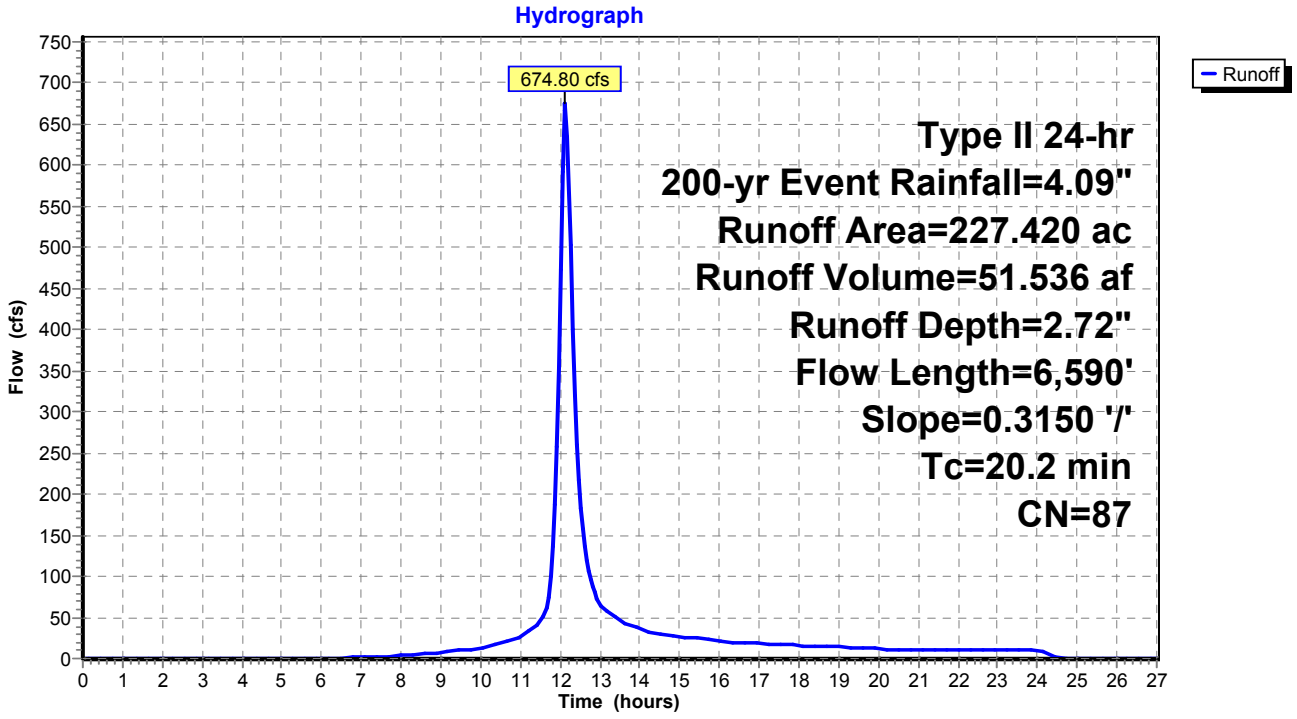
Runoff = 674.80 cfs @ 12.13 hrs, Volume= 51.536 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	204.680	86	Desert shrub range, Fair, HSG D
*	22.740	98	Impervious, HSG D
	227.420	87	Weighted Average
	204.680		90.00% Pervious Area
	22.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	6,590	0.3150	5.44		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

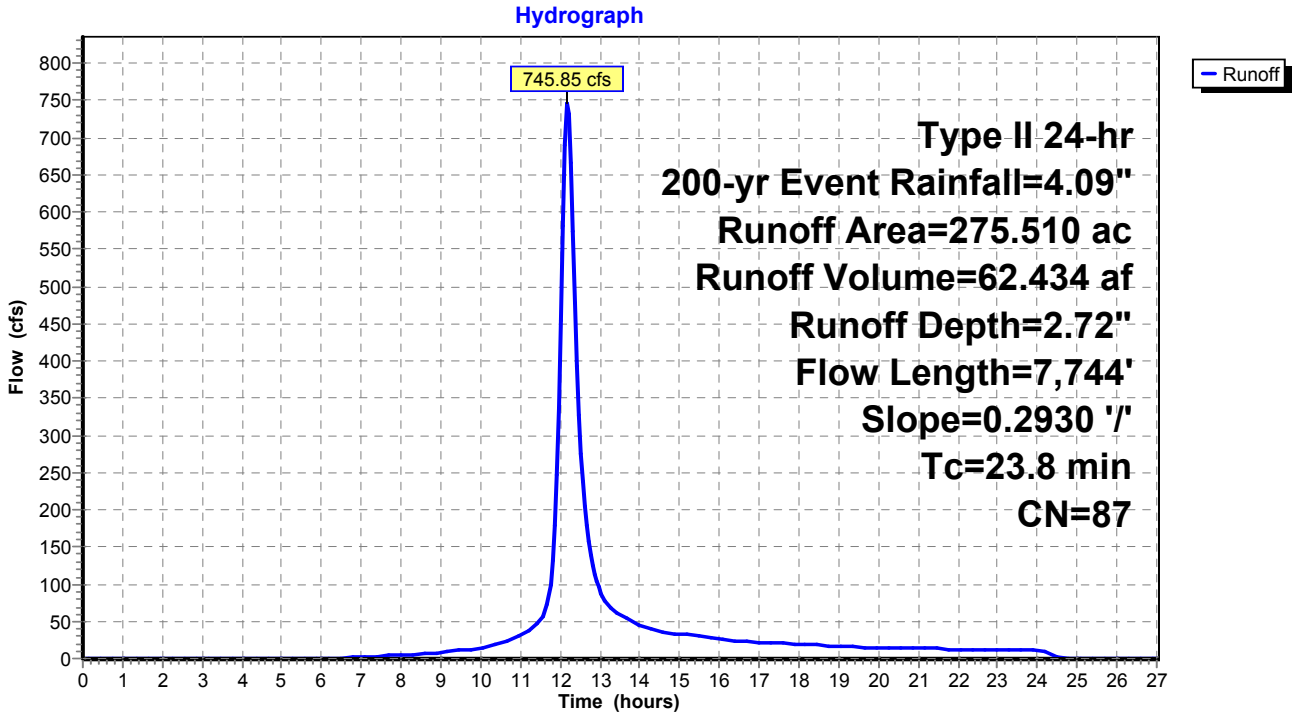
Runoff = 745.85 cfs @ 12.17 hrs, Volume= 62.434 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 200-yr Event Rainfall=4.09"

	Area (ac)	CN	Description
	247.960	86	Desert shrub range, Fair, HSG D
*	27.550	98	Impervious, HSG D
	275.510	87	Weighted Average
	247.960		90.00% Pervious Area
	27.550		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	7,744	0.2930	5.42		**Lag/CN Method,**

Subcatchment 13: WS 13



Summary for Reach CHNL 1: Channel 1

Inflow Area = 502.930 ac, 10.00% Impervious, Inflow Depth = 2.72" for 200-yr Event event
Inflow = 1,409.59 cfs @ 12.15 hrs, Volume= 113.970 af
Outflow = 1,364.28 cfs @ 12.24 hrs, Volume= 113.968 af, Atten= 3%, Lag= 5.8 min

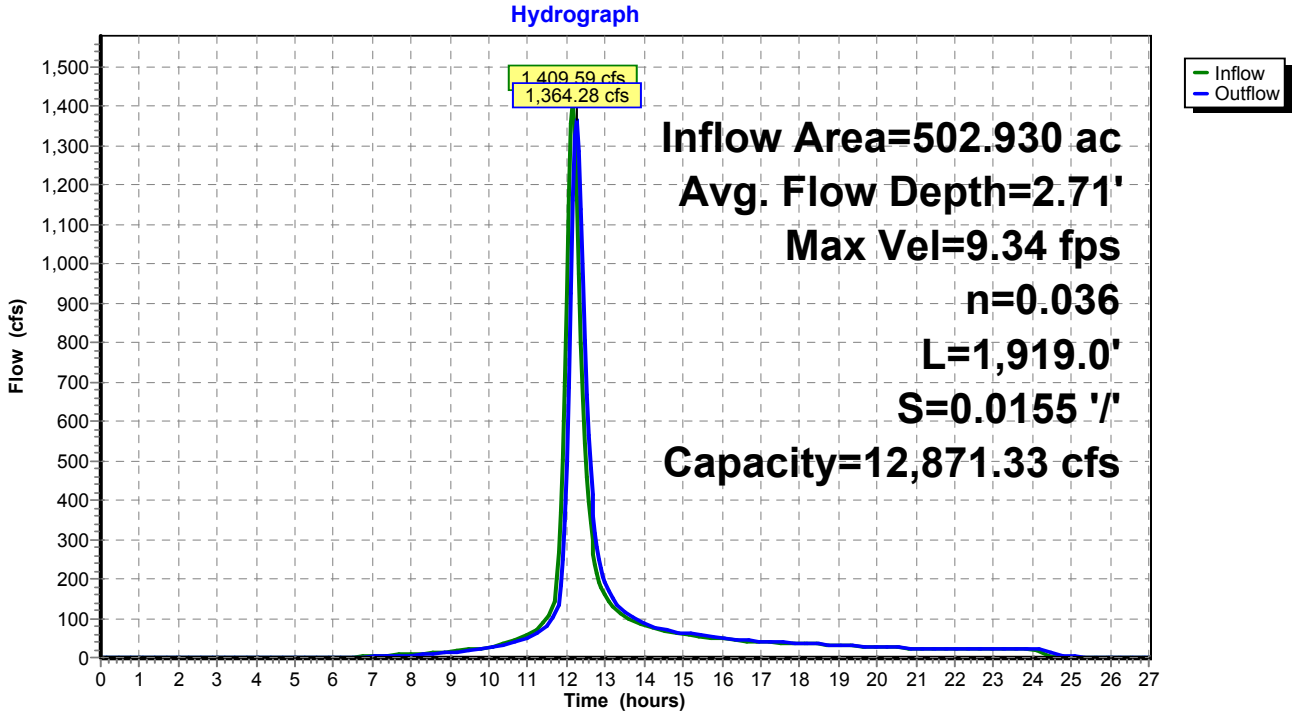
Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.34 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 2.31 fps, Avg. Travel Time= 13.9 min

Peak Storage= 281,335 cf @ 12.18 hrs
Average Depth at Peak Storage= 2.71'
Bank-Full Depth= 10.00' Flow Area= 650.0 sf, Capacity= 12,871.33 cfs

50.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 80.00'
Length= 1,919.0' Slope= 0.0155 '/'
Inlet Invert= 5,569.50', Outlet Invert= 5,539.70'

‡

Reach CHNL 1: Channel 1



Summary for Reach CHNL 2: Channel 2

Inflow Area = 870.220 ac, 10.00% Impervious, Inflow Depth = 2.72" for 200-yr Event event
Inflow = 2,220.40 cfs @ 12.14 hrs, Volume= 197.202 af
Outflow = 1,835.68 cfs @ 12.47 hrs, Volume= 196.763 af, Atten= 17%, Lag= 20.0 min

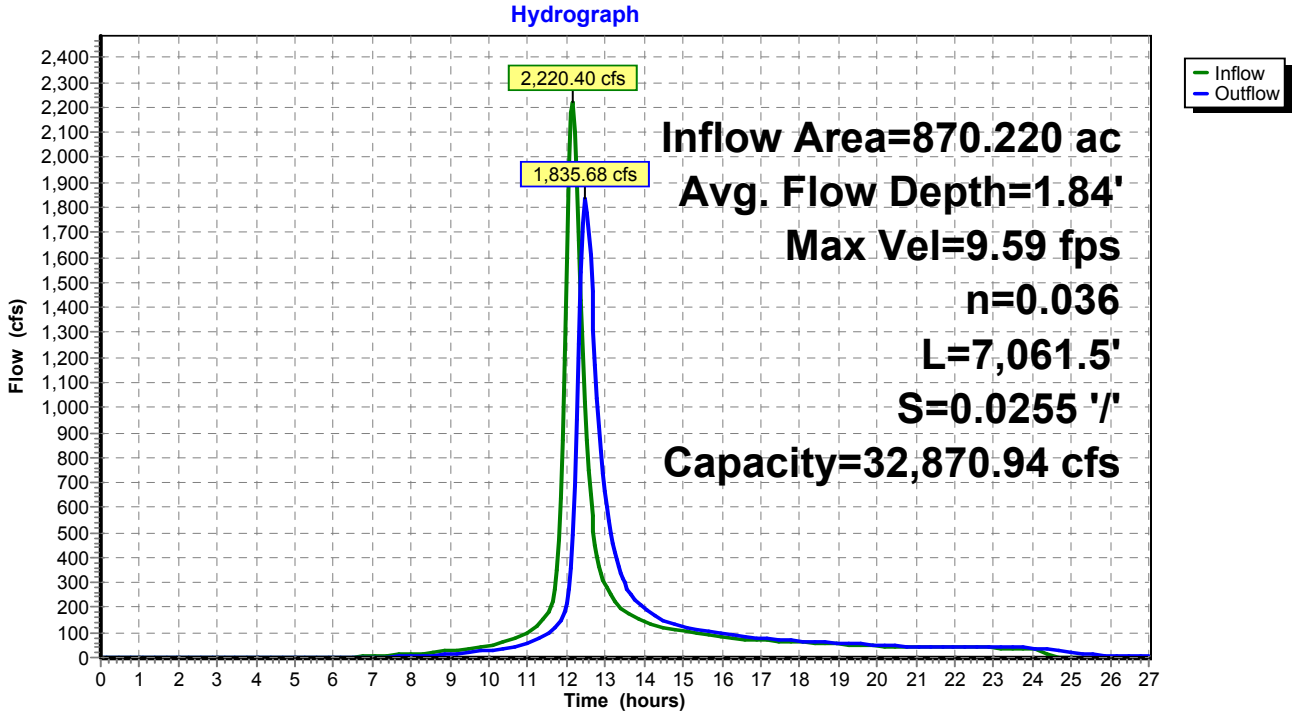
Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.59 fps, Min. Travel Time= 12.3 min
Avg. Velocity = 2.61 fps, Avg. Travel Time= 45.2 min

Peak Storage= 1,352,568 cf @ 12.27 hrs
Average Depth at Peak Storage= 1.84'
Bank-Full Depth= 10.00' Flow Area= 1,225.0 sf, Capacity= 32,870.94 cfs

100.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 2.5 2.0 '/' Top Width= 145.00'
Length= 7,061.5' Slope= 0.0255 '/'
Inlet Invert= 5,720.00', Outlet Invert= 5,539.70'

‡

Reach CHNL 2: Channel 2



Summary for Reach CHNL 3: Channel 3

[62] Hint: Exceeded Reach CHNL 1 OUTLET depth by 3.89' @ 12.45 hrs
[62] Hint: Exceeded Reach CHNL 2 OUTLET depth by 4.08' @ 12.40 hrs

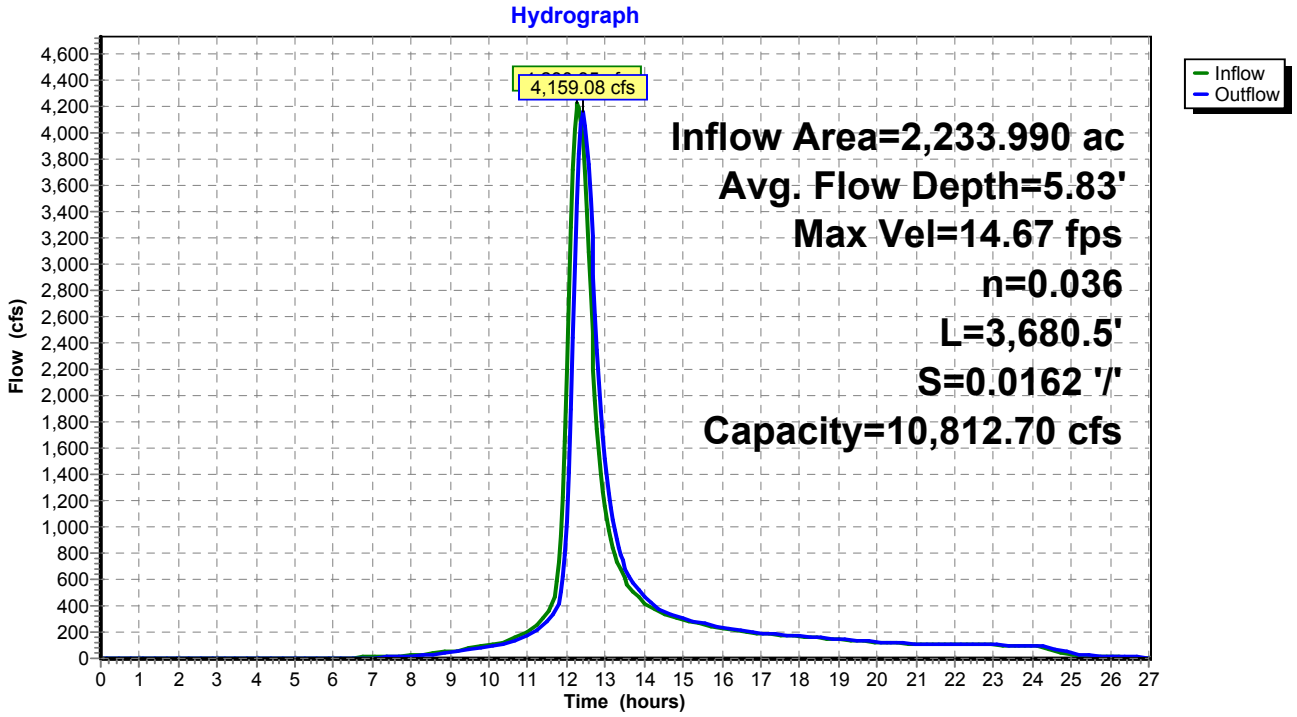
Inflow Area = 2,233.990 ac, 10.00% Impervious, Inflow Depth > 2.72" for 200-yr Event event
Inflow = 4,230.35 cfs @ 12.29 hrs, Volume= 505.807 af
Outflow = 4,159.08 cfs @ 12.41 hrs, Volume= 505.394 af, Atten= 2%, Lag= 7.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.67 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 4.37 fps, Avg. Travel Time= 14.1 min

Peak Storage= 1,046,926 cf @ 12.34 hrs
Average Depth at Peak Storage= 5.83'
Bank-Full Depth= 10.00' Flow Area= 550.0 sf, Capacity= 10,812.70 cfs

40.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 70.00'
Length= 3,680.5' Slope= 0.0162 '/'
Inlet Invert= 5,539.70', Outlet Invert= 5,480.00'

Reach CHNL 3: Channel 3



Summary for Reach CHNL 4: Channel 4

[61] Hint: Exceeded Reach CHNL 3 outlet invert by 4.10' @ 12.40 hrs

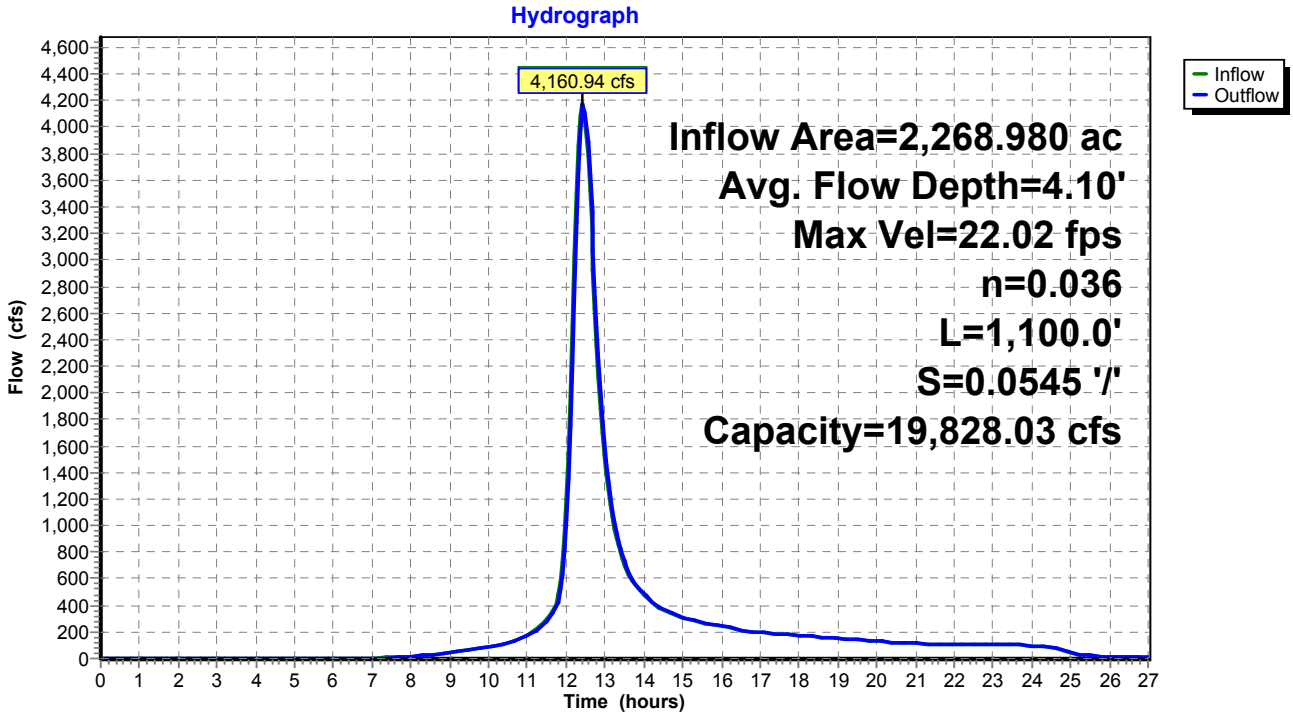
Inflow Area = 2,268.980 ac, 10.00% Impervious, Inflow Depth > 2.71" for 200-yr Event event
Inflow = 4,176.49 cfs @ 12.41 hrs, Volume= 513.323 af
Outflow = 4,160.94 cfs @ 12.43 hrs, Volume= 513.234 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.02 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 6.44 fps, Avg. Travel Time= 2.8 min

Peak Storage= 208,374 cf @ 12.42 hrs
Average Depth at Peak Storage= 4.10'
Bank-Full Depth= 10.00' Flow Area= 550.0 sf, Capacity= 19,828.03 cfs

40.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 70.00'
Length= 1,100.0' Slope= 0.0545 '/'
Inlet Invert= 5,480.00', Outlet Invert= 5,420.00'

Reach CHNL 4: Channel 4



Summary for Reach CHNL 5: Channel 5

[62] Hint: Exceeded Reach CHNL 4 OUTLET depth by 2.66' @ 12.50 hrs

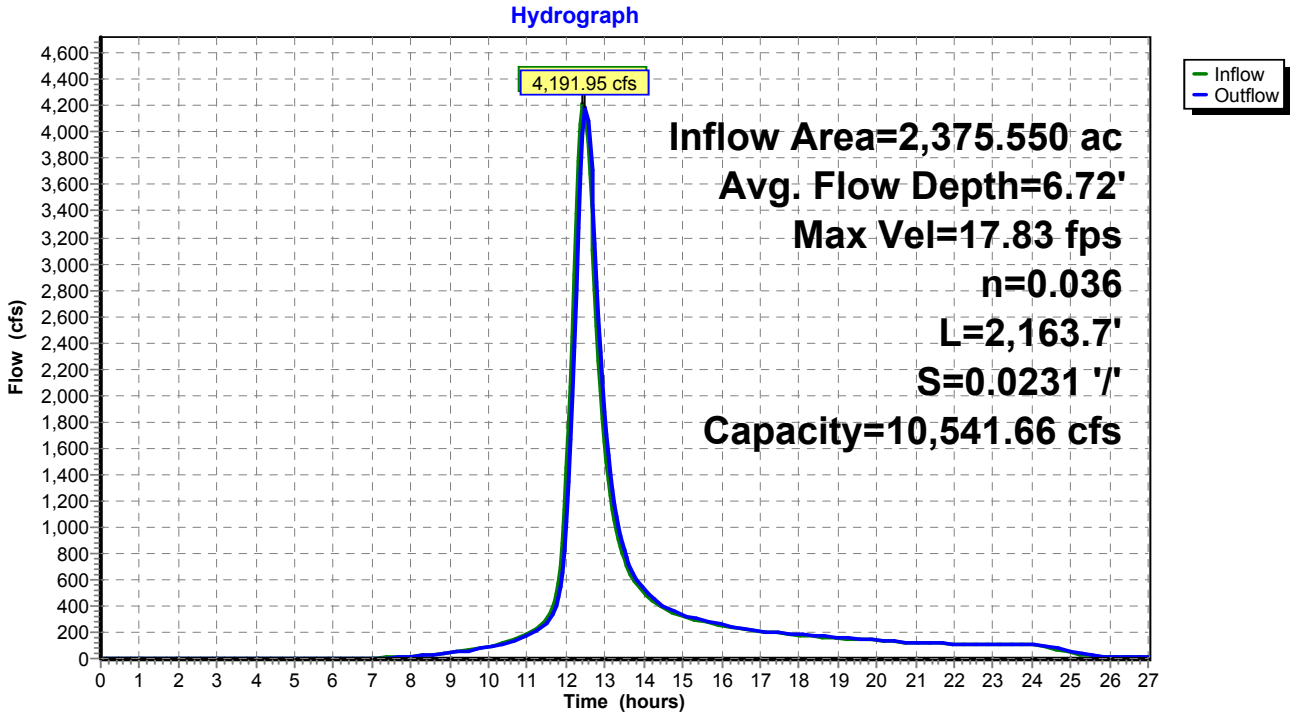
Inflow Area = 2,375.550 ac, 10.00% Impervious, Inflow Depth > 2.71" for 200-yr Event event
Inflow = 4,217.67 cfs @ 12.43 hrs, Volume= 537.384 af
Outflow = 4,191.95 cfs @ 12.49 hrs, Volume= 537.163 af, Atten= 1%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 17.83 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 5.77 fps, Avg. Travel Time= 6.2 min

Peak Storage= 510,334 cf @ 12.46 hrs
Average Depth at Peak Storage= 6.72'
Bank-Full Depth= 11.00' Flow Area= 456.5 sf, Capacity= 10,541.66 cfs

25.00' x 11.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 58.00'
Length= 2,163.7' Slope= 0.0231 '/'
Inlet Invert= 5,420.00', Outlet Invert= 5,370.00'

Reach CHNL 5: Channel 5



Summary for Pond CLVT 1: Culvert Crossing #1

[62] Hint: Exceeded Reach CHNL 5 OUTLET depth by 17.28' @ 12.75 hrs

Inflow Area = 2,375.550 ac, 10.00% Impervious, Inflow Depth > 2.71" for 200-yr Event event
Inflow = 4,191.95 cfs @ 12.49 hrs, Volume= 537.163 af
Outflow = 3,410.14 cfs @ 12.71 hrs, Volume= 537.020 af, Atten= 19%, Lag= 12.9 min
Primary = 3,410.14 cfs @ 12.71 hrs, Volume= 537.020 af

Routing by Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 5,392.92' @ 12.71 hrs Surf.Area= 0 sf Storage= 1,758,861 cf
Flood Elev= 5,419.00' Surf.Area= 0 sf Storage= 12,108,960 cf

Plug-Flow detention time= 4.1 min calculated for 537.020 af (100% of inflow)
Center-of-Mass det. time= 4.0 min (860.7 - 856.8)

Volume	Invert	Avail.Storage	Storage Description
#1	5,370.00'	12,108,960 cf	**Culvert Crossing #1** Listed below

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

Elevation (feet)	Cum.Store (cubic-feet)
5,370.00	0
5,371.00	1,264
5,372.00	4,909
5,373.00	7,513
5,374.00	16,645
5,375.00	29,237
5,376.00	46,725
5,377.00	71,156
5,378.00	103,816
5,379.00	144,375
5,380.00	193,809
5,381.00	252,611
5,382.00	321,098
5,383.00	399,998
5,384.00	488,627
5,385.00	587,544
5,386.00	697,578
5,387.00	818,723
5,388.00	950,841
5,389.00	1,094,170
5,390.00	1,248,216
5,391.00	1,412,011
5,392.00	1,587,481
5,393.00	1,774,410
5,394.00	1,971,598
5,395.00	2,046,356
5,396.00	2,266,171
5,397.00	2,498,604
5,398.00	2,742,207
5,399.00	2,998,577
5,400.00	3,272,610
5,401.00	3,564,605
5,402.00	3,875,249
5,403.00	4,205,411
5,404.00	4,554,001
5,405.00	4,921,330
5,406.00	5,306,733
5,407.00	5,710,058
5,408.00	6,132,117
5,409.00	6,572,849
5,410.00	7,032,579
5,411.00	7,512,479
5,412.00	8,012,116
5,413.00	8,533,107
5,414.00	9,078,172
5,415.00	9,647,155
5,416.00	10,235,642
5,417.00	10,841,380
5,418.00	11,465,162
5,419.00	12,108,960

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015
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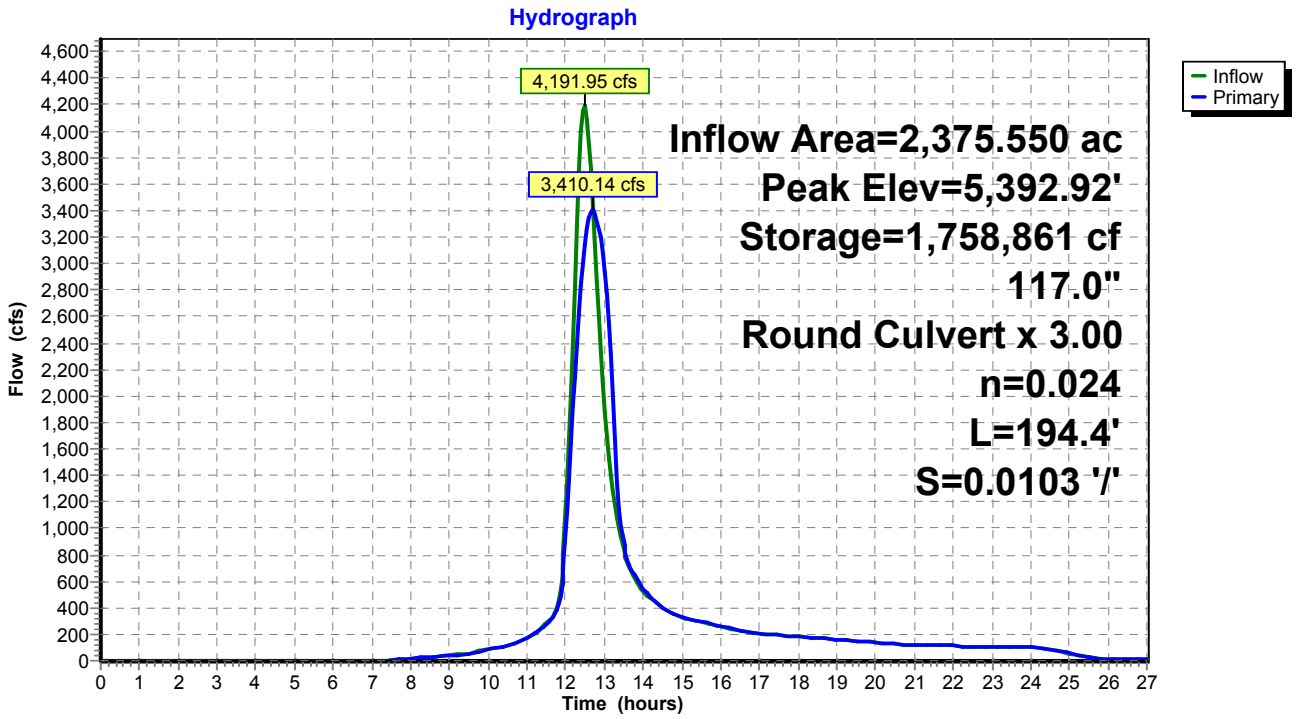
Device	Routing	Invert	Outlet Devices
#1	Primary	5,372.00'	**117.0" Round Culvert X 3.00** L= 194.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5,372.00' / 5,370.00' S= 0.0103 '/' Cc= 0.900 n= 0.024, Flow Area= 74.66 sf

Primary OutFlow Max=3,408.57 cfs @ 12.71 hrs HW=5,392.90' (Free Discharge)
1=Culvert (Inlet Controls 3,408.57 cfs @ 15.22 fps)

Pond CLVT 1: Culvert Crossing #1



Summary for Pond CLVT 2: Culvert Crossing #2

[81] Warning: Exceeded Pond CLVT 1 by 11.78' @ 13.40 hrs

Inflow Area = 2,403.760 ac, 10.00% Impervious, Inflow Depth > 2.71" for 200-yr Event event
Inflow = 3,418.33 cfs @ 12.71 hrs, Volume= 543.413 af
Outflow = 1,658.81 cfs @ 13.25 hrs, Volume= 543.361 af, Atten= 51%, Lag= 32.8 min
Primary = 1,658.81 cfs @ 13.25 hrs, Volume= 543.361 af

Routing by Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 5,391.04' @ 13.25 hrs Surf.Area= 0 sf Storage= 6,444,314 cf
Flood Elev= 5,403.00' Surf.Area= 0 sf Storage= 10,142,539 cf

Plug-Flow detention time= 30.6 min calculated for 543.361 af (100% of inflow)
Center-of-Mass det. time= 30.5 min (890.6 - 860.1)

Volume	Invert	Avail.Storage	Storage Description
#1	5,352.00'	10,142,539 cf	**Existing Pond** Listed below

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 200-yr Event Rainfall=4.09"*
Prepared by M3 Engineering Printed 11/24/2015

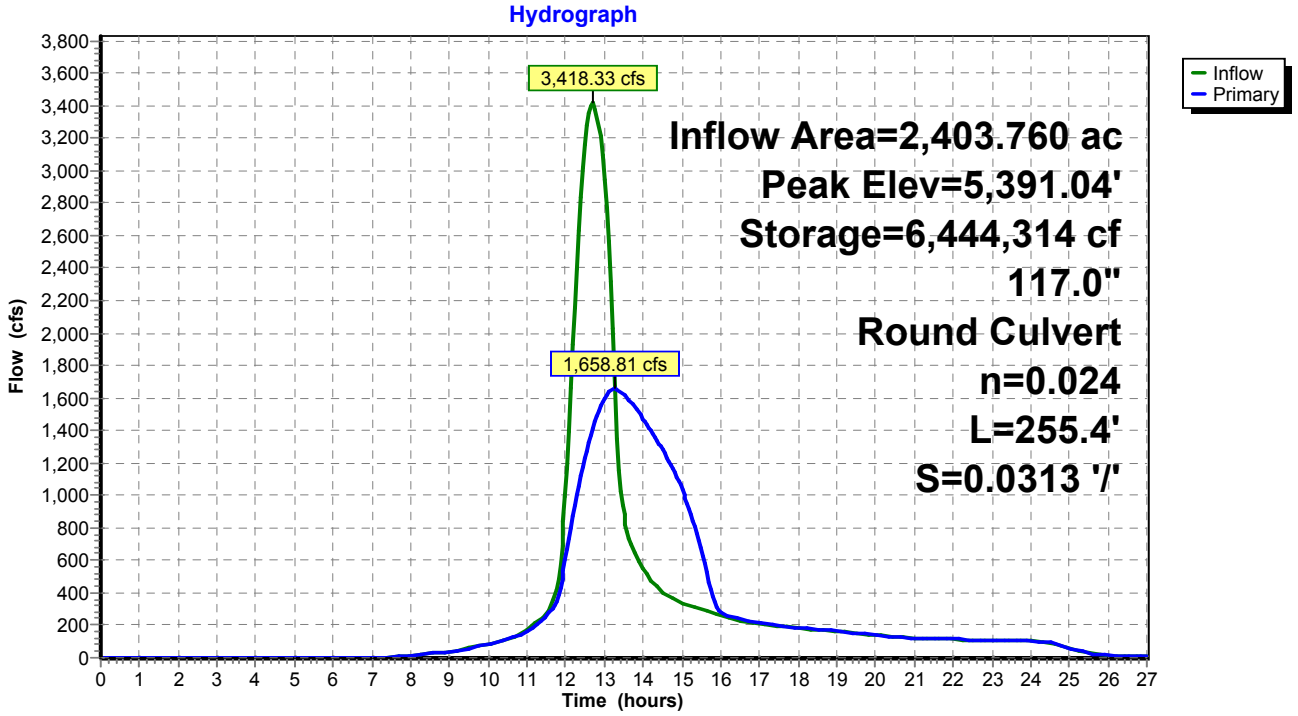
Elevation (feet)	Cum.Store (cubic-feet)
5,352.00	0
5,353.00	2,681
5,354.00	7,382
5,355.00	15,397
5,356.00	28,286
5,357.00	47,224
5,358.00	75,773
5,359.00	117,133
5,360.00	170,345
5,361.00	235,331
5,362.00	312,331
5,363.00	399,765
5,364.00	497,494
5,365.00	605,663
5,366.00	724,610
5,367.00	855,928
5,368.00	1,000,315
5,369.00	1,157,122
5,370.00	1,325,832
5,371.00	1,505,243
5,372.00	1,693,878
5,373.00	1,890,808
5,374.00	2,095,234
5,375.00	2,306,959
5,376.00	2,525,755
5,377.00	2,751,367
5,378.00	2,983,426
5,379.00	3,221,478
5,380.00	3,465,168
5,381.00	3,714,247
5,382.00	3,968,434
5,383.00	4,227,291
5,384.00	4,490,405
5,385.00	4,757,518
5,386.00	5,028,418
5,387.00	5,302,894
5,388.00	5,580,732
5,389.00	5,861,867
5,390.00	6,146,219
5,391.00	6,433,776
5,392.00	6,724,543
5,393.00	7,018,534
5,394.00	7,315,762
5,395.00	7,616,273
5,396.00	7,920,106
5,397.00	8,227,290
5,398.00	8,537,855
5,399.00	8,851,826
5,400.00	9,169,229
5,401.00	9,490,117

5,402.00	9,814,540
5,403.00	10,142,539

Device	Routing	Invert	Outlet Devices
#1	Primary	5,352.00'	**117.0" Round Culvert** L= 255.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5,352.00' / 5,344.00' S= 0.0313 '/' Cc= 0.900 n= 0.024, Flow Area= 74.66 sf

Primary OutFlow Max=1,658.65 cfs @ 13.25 hrs HW=5,391.03' (Free Discharge)
1=Culvert (Inlet Controls 1,658.65 cfs @ 22.22 fps)

Pond CLVT 2: Culvert Crossing #2



Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Time span=0.00-27.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: WS 1 Runoff Area=28.210 ac 10.00% Impervious Runoff Depth=3.19"
Tc=5.0 min CN=87 Runoff=155.94 cfs 7.504 af

Subcatchment2: WS 2 Runoff Area=106.570 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,068' Slope=0.3140 '/' Tc=11.0 min CN=87 Runoff=484.31 cfs 28.349 af

Subcatchment3: WS 3 Runoff Area=34.990 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=1,603' Slope=0.1770 '/' Tc=8.7 min CN=87 Runoff=172.66 cfs 9.308 af

Subcatchment4: WS 4 Runoff Area=75.020 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,047' Slope=0.3390 '/' Tc=10.5 min CN=87 Runoff=346.92 cfs 19.956 af

Subcatchment5: WS 5 Runoff Area=124.190 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=5,976' Slope=0.3400 '/' Tc=18.0 min CN=87 Runoff=458.61 cfs 33.036 af

Subcatchment6: WS 6 Runoff Area=331.220 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=8,173' Slope=0.3100 '/' Tc=24.2 min CN=87 Runoff=1,038.74 cfs 88.109 af

Subcatchment7: WS 7 Runoff Area=144.470 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=5,064' Slope=0.2960 '/' Tc=16.9 min CN=87 Runoff=550.14 cfs 38.431 af

Subcatchment8: WS 8 Runoff Area=92.010 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=3,617' Slope=0.2740 '/' Tc=13.4 min CN=87 Runoff=389.99 cfs 24.476 af

Subcatchment9: WS 9 Runoff Area=235.910 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,005' Slope=0.2680 '/' Tc=23.0 min CN=87 Runoff=761.76 cfs 62.755 af

Subcatchment10: WS 10 Runoff Area=330.410 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=10,278' Slope=0.2760 '/' Tc=30.8 min CN=87 Runoff=891.85 cfs 87.894 af

Subcatchment11: WS 11 Runoff Area=397.830 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,149' Slope=0.1820 '/' Tc=28.3 min CN=87 Runoff=1,132.73 cfs 105.828 af

Subcatchment12: WS 12 Runoff Area=227.420 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=6,590' Slope=0.3150 '/' Tc=20.2 min CN=87 Runoff=789.72 cfs 60.497 af

Subcatchment13: WS 13 Runoff Area=275.510 ac 10.00% Impervious Runoff Depth=3.19"
Flow Length=7,744' Slope=0.2930 '/' Tc=23.8 min CN=87 Runoff=871.93 cfs 73.289 af

Reach CHNL 1: Channel 1 Avg. Flow Depth=2.98' Max Vel=9.88 fps Inflow=1,647.46 cfs 133.786 af
n=0.036 L=1,919.0' S=0.0155 '/' Capacity=12,871.33 cfs Outflow=1,601.86 cfs 133.784 af

Reach CHNL 2: Channel 2 Avg. Flow Depth=2.04' Max Vel=10.26 fps Inflow=2,597.10 cfs 231.491 af
n=0.036 L=7,061.5' S=0.0255 '/' Capacity=32,870.94 cfs Outflow=2,180.53 cfs 231.028 af

Reach CHNL 3: Channel 3 Avg. Flow Depth=6.49' Max Vel=15.55 fps Inflow=5,094.93 cfs 593.807 af
n=0.036 L=3,680.5' S=0.0162 '/' Capacity=10,812.70 cfs Outflow=5,008.23 cfs 593.385 af

Reach CHNL 4: Channel 4 Avg. Flow Depth=4.57' Max Vel=23.45 fps Inflow=5,028.84 cfs 602.692 af
n=0.036 L=1,100.0' S=0.0545 '/' Capacity=19,828.03 cfs Outflow=5,012.38 cfs 602.599 af

Reach CHNL 5: Channel 5 Avg. Flow Depth=7.44' Max Vel=18.81 fps Inflow=5,080.00 cfs 630.949 af
n=0.036 L=2,163.7' S=0.0231 '/' Capacity=10,541.66 cfs Outflow=5,046.09 cfs 630.724 af

Pond CLVT 1: Culvert Crossing Peak Elev=5,397.29' Storage=2,570,184 cf Inflow=5,046.09 cfs 630.724 af
117.0" Round Culvert x 3.00 n=0.024 L=194.4' S=0.0103 '/' Outflow=3,847.35 cfs 630.580 af

Pond CLVT 2: Culvert Crossing Peak Elev=5,396.71' Storage=8,137,086 cf Inflow=3,856.73 cfs 638.084 af
117.0" Round Culvert n=0.024 L=255.4' S=0.0313 '/' Outflow=1,791.19 cfs 638.031 af

Total Runoff Area = 2,403.760 ac Runoff Volume = 639.433 af Average Runoff Depth = 3.19"
90.00% Pervious = 2,163.390 ac 10.00% Impervious = 240.370 ac

Summary for Subcatchment 1: WS 1

[49] Hint: Tc<2dt may require smaller dt

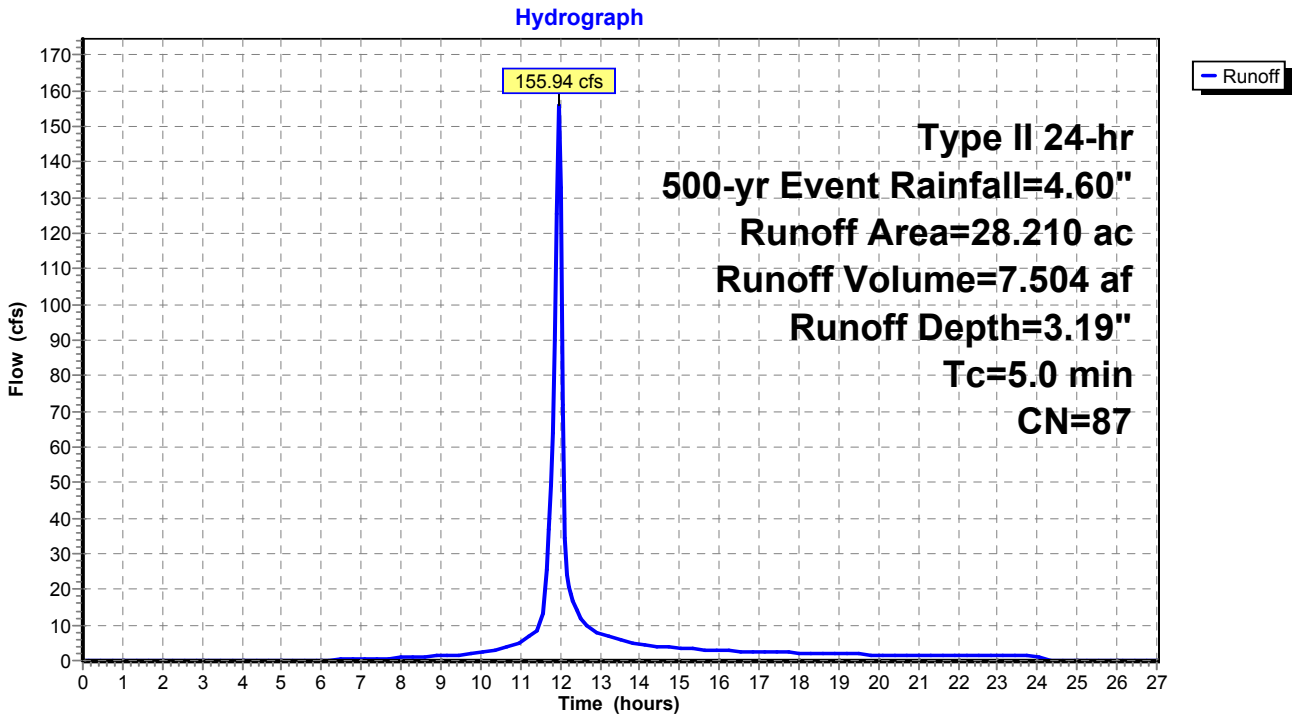
Runoff = 155.94 cfs @ 11.95 hrs, Volume= 7.504 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	25.390	86	Desert shrub range, Fair, HSG D
*	2.820	98	Impervious, HSG D
	28.210	87	Weighted Average
	25.390		90.00% Pervious Area
	2.820		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment 1: WS 1



Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Summary for Subcatchment 2: WS 2

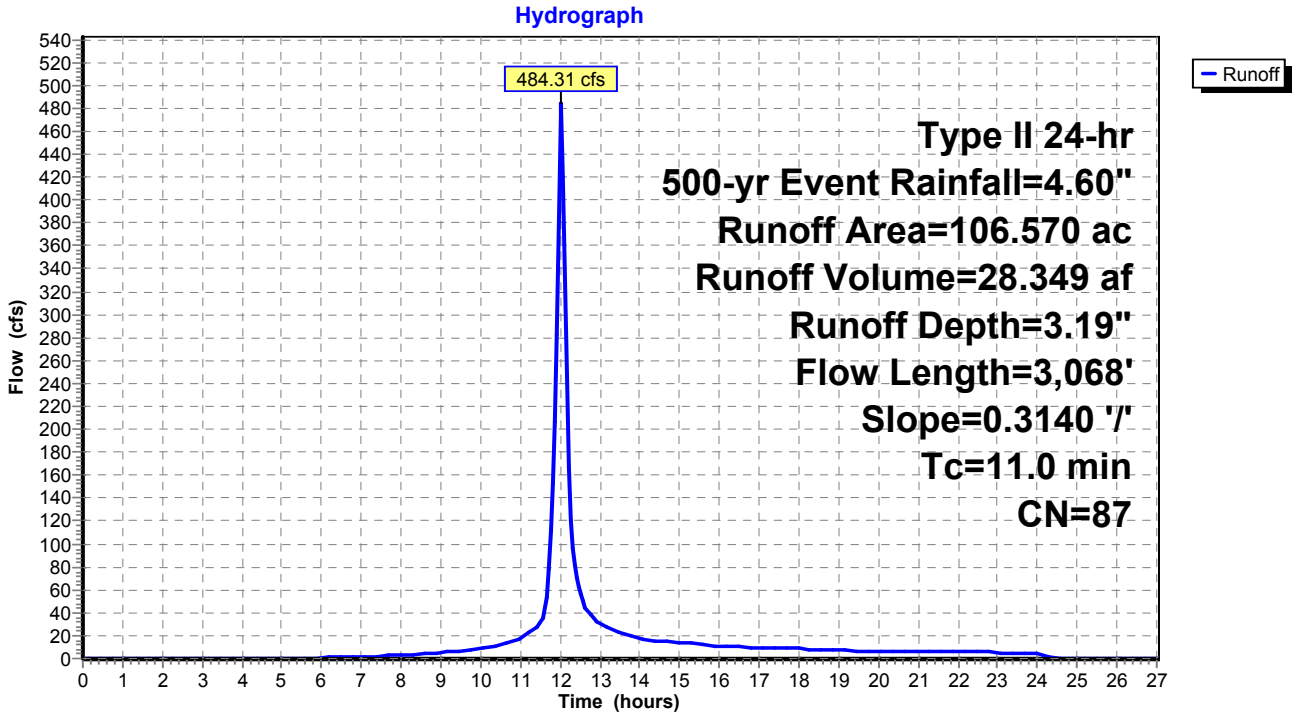
Runoff = 484.31 cfs @ 12.02 hrs, Volume= 28.349 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	95.910	86	Desert shrub range, Fair, HSG D
*	10.660	98	Impervious, HSG D
	106.570	87	Weighted Average
	95.910		90.00% Pervious Area
	10.660		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	3,068	0.3140	4.66		**Lag/CN Method,**

Subcatchment 2: WS 2



Summary for Subcatchment 3: WS 3

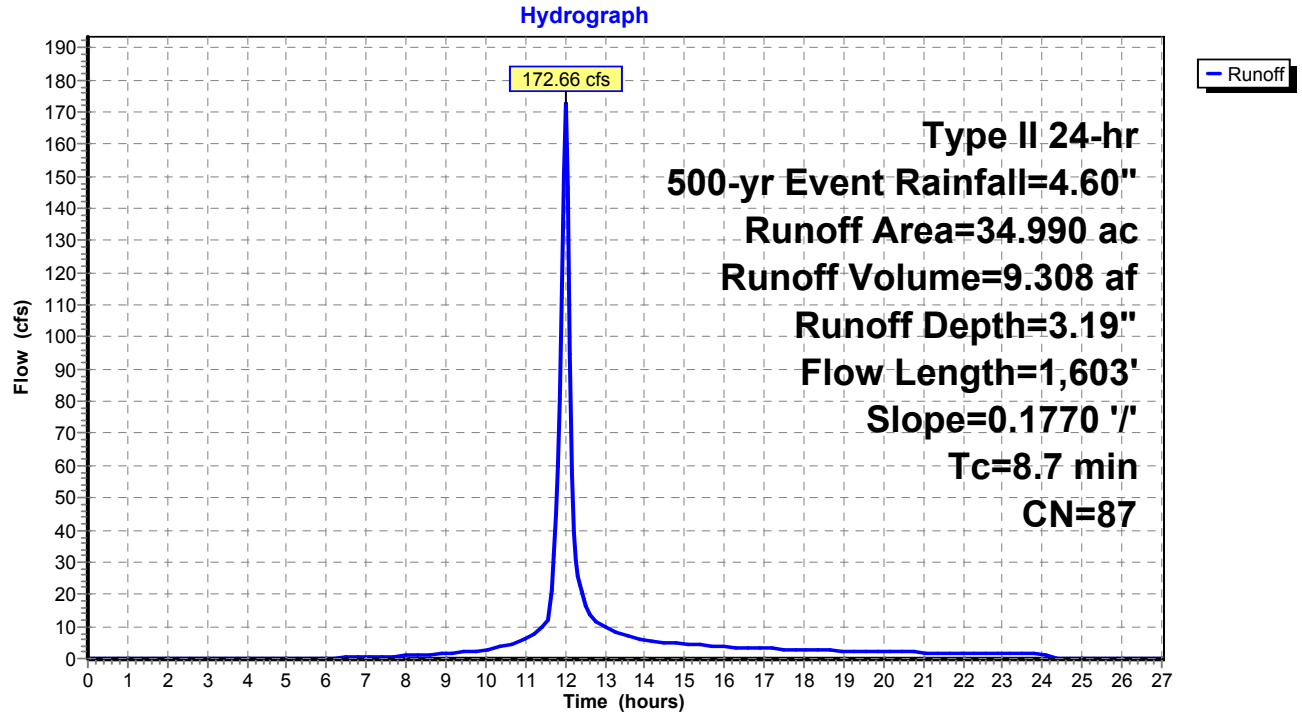
Runoff = 172.66 cfs @ 12.00 hrs, Volume= 9.308 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	31.490	86	Desert shrub range, Fair, HSG D
*	3.500	98	Impervious, HSG D
	34.990	87	Weighted Average
	31.490		90.00% Pervious Area
	3.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	1,603	0.1770	3.07		**Lag/CN Method,**

Subcatchment 3: WS 3



Summary for Subcatchment 4: WS 4

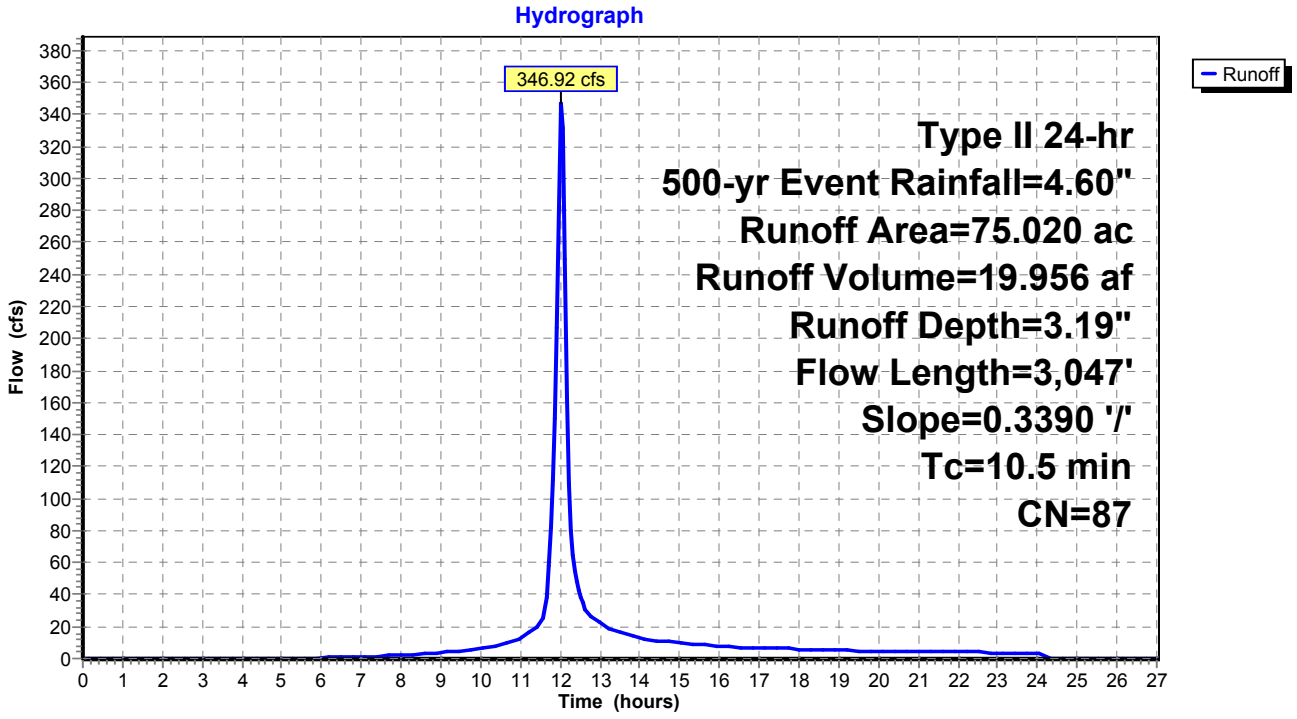
Runoff = 346.92 cfs @ 12.02 hrs, Volume= 19.956 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	67.520	86	Desert shrub range, Fair, HSG D
*	7.500	98	Impervious, HSG D
	75.020	87	Weighted Average
	67.520		90.00% Pervious Area
	7.500		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	3,047	0.3390	4.84		**Lag/CN Method,**

Subcatchment 4: WS 4



Summary for Subcatchment 5: WS 5

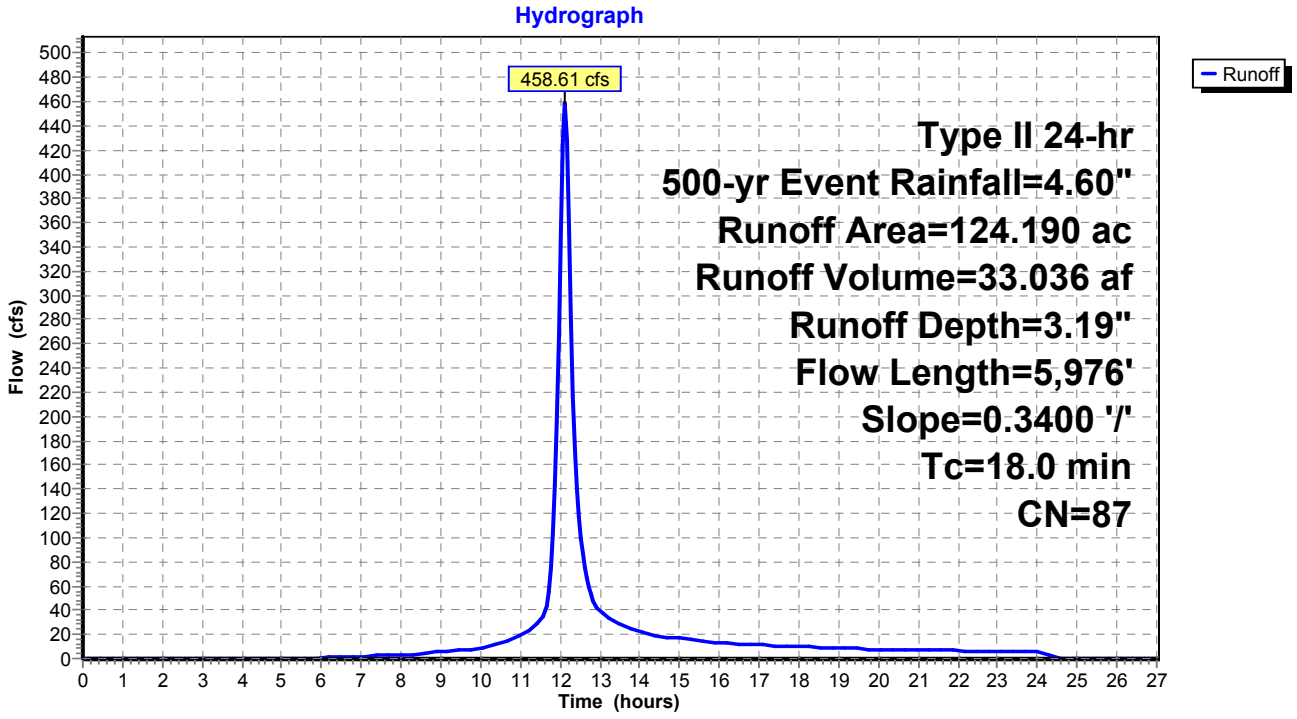
Runoff = 458.61 cfs @ 12.10 hrs, Volume= 33.036 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	111.770	86	Desert shrub range, Fair, HSG D
*	12.420	98	Impervious, HSG D
	124.190	87	Weighted Average
	111.770		90.00% Pervious Area
	12.420		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	5,976	0.3400	5.54		**Lag/CN Method,**

Subcatchment 5: WS 5



Summary for Subcatchment 6: WS 6

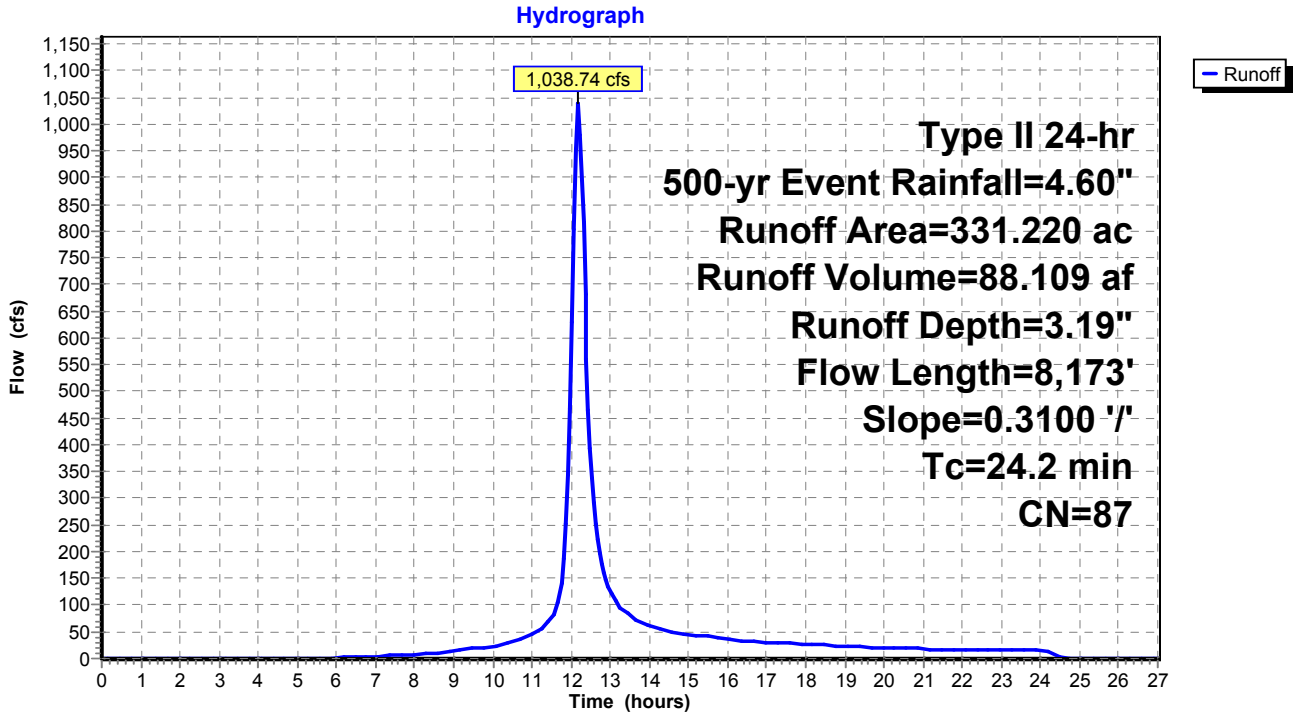
Runoff = 1,038.74 cfs @ 12.17 hrs, Volume= 88.109 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	298.100	86	Desert shrub range, Fair, HSG D
*	33.120	98	Impervious, HSG D
	331.220	87	Weighted Average
	298.100		90.00% Pervious Area
	33.120		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	8,173	0.3100	5.64		**Lag/CN Method,**

Subcatchment 6: WS 6



Summary for Subcatchment 7: WS 7

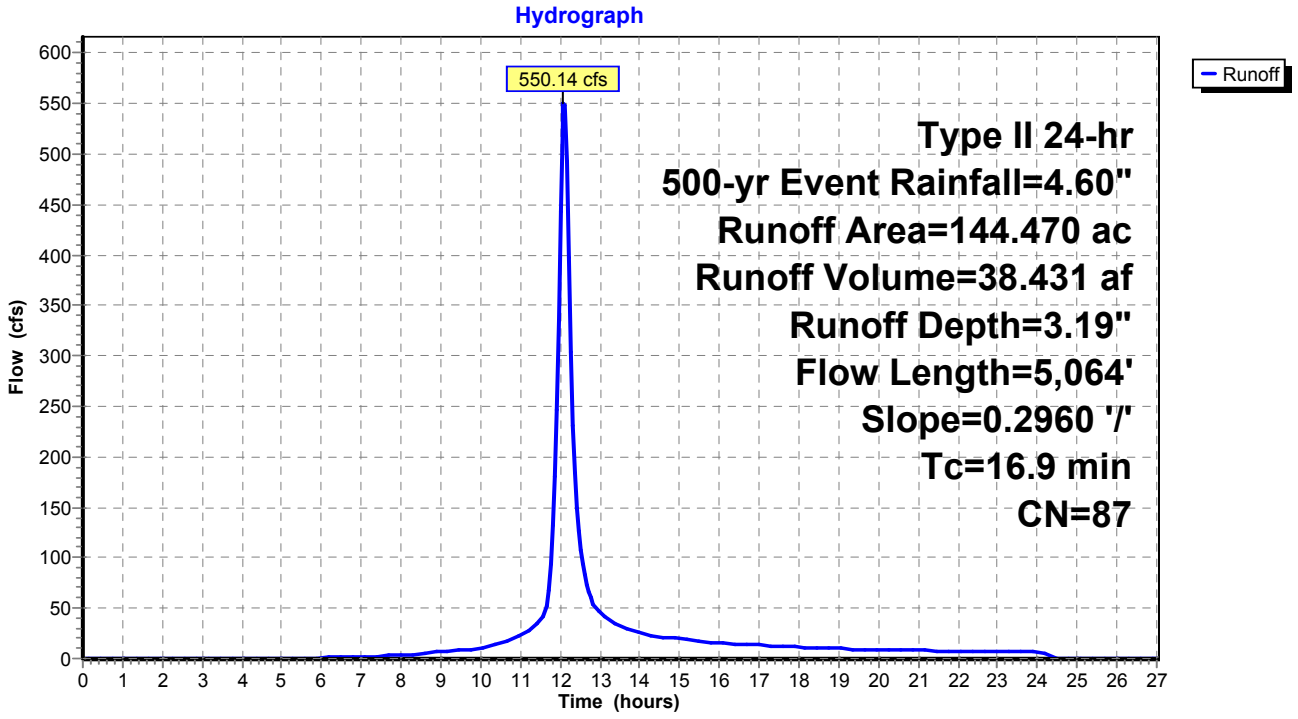
Runoff = 550.14 cfs @ 12.09 hrs, Volume= 38.431 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	130.020	86	Desert shrub range, Fair, HSG D
*	14.450	98	Impervious, HSG D
	144.470	87	Weighted Average
	130.020		90.00% Pervious Area
	14.450		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	5,064	0.2960	5.00		**Lag/CN Method,**

Subcatchment 7: WS 7



Summary for Subcatchment 8: WS 8

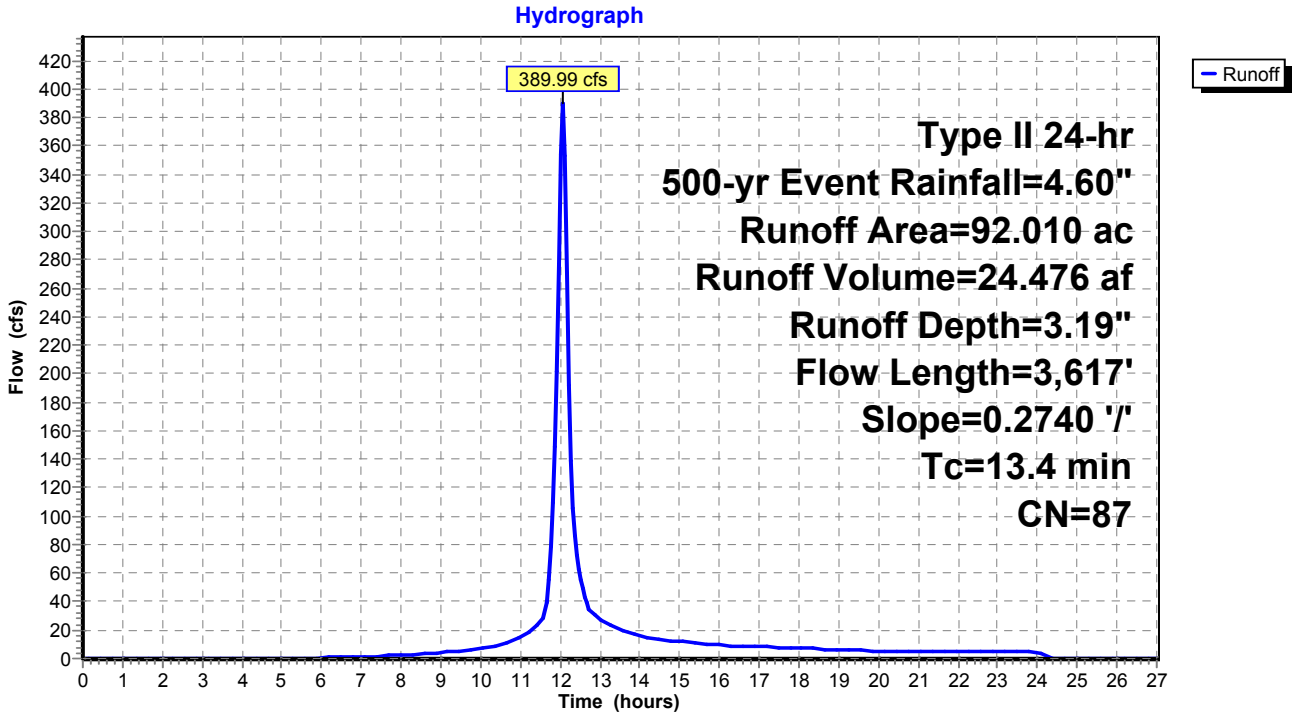
Runoff = 389.99 cfs @ 12.05 hrs, Volume= 24.476 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	82.810	86	Desert shrub range, Fair, HSG D
*	9.200	98	Impervious, HSG D
	92.010	87	Weighted Average
	82.810		90.00% Pervious Area
	9.200		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	3,617	0.2740	4.50		**Lag/CN Method,**

Subcatchment 8: WS 8



Summary for Subcatchment 9: WS 9

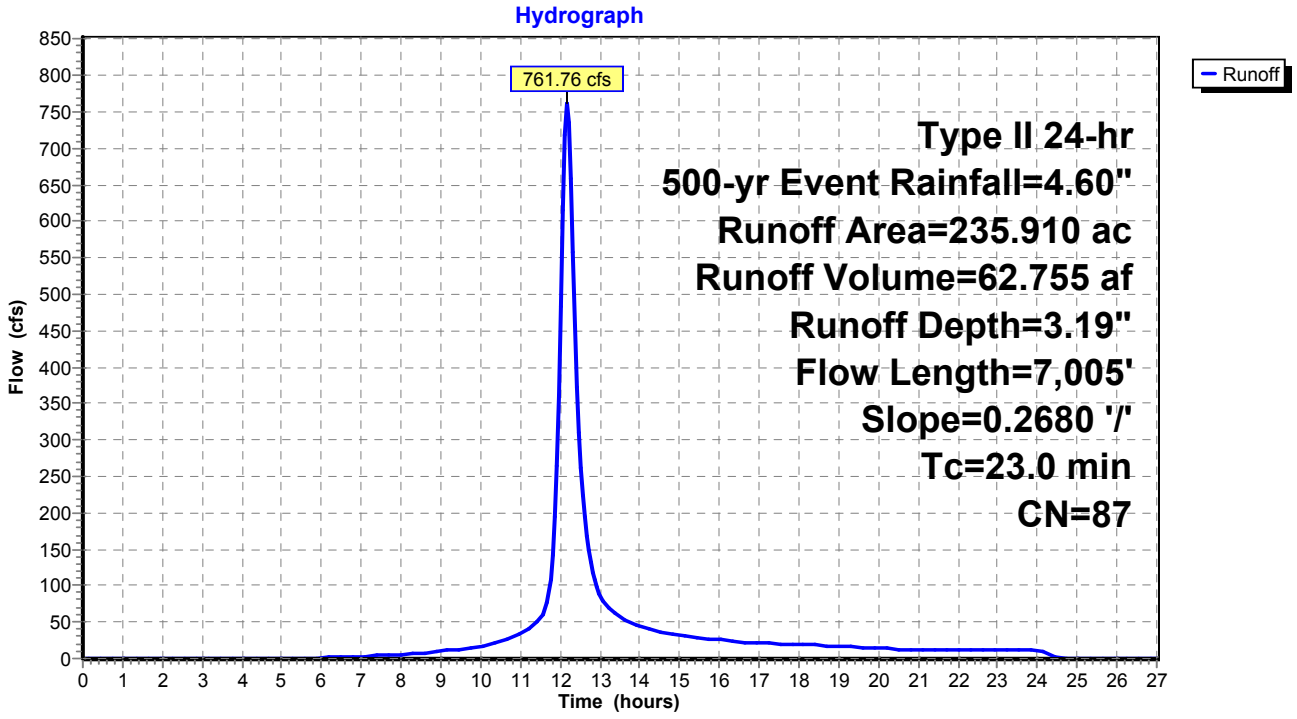
Runoff = 761.76 cfs @ 12.16 hrs, Volume= 62.755 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	212.320	86	Desert shrub range, Fair, HSG D
*	23.590	98	Impervious, HSG D
	235.910	87	Weighted Average
	212.320		90.00% Pervious Area
	23.590		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	7,005	0.2680	5.08		**Lag/CN Method,**

Subcatchment 9: WS 9



Summary for Subcatchment 10: WS 10

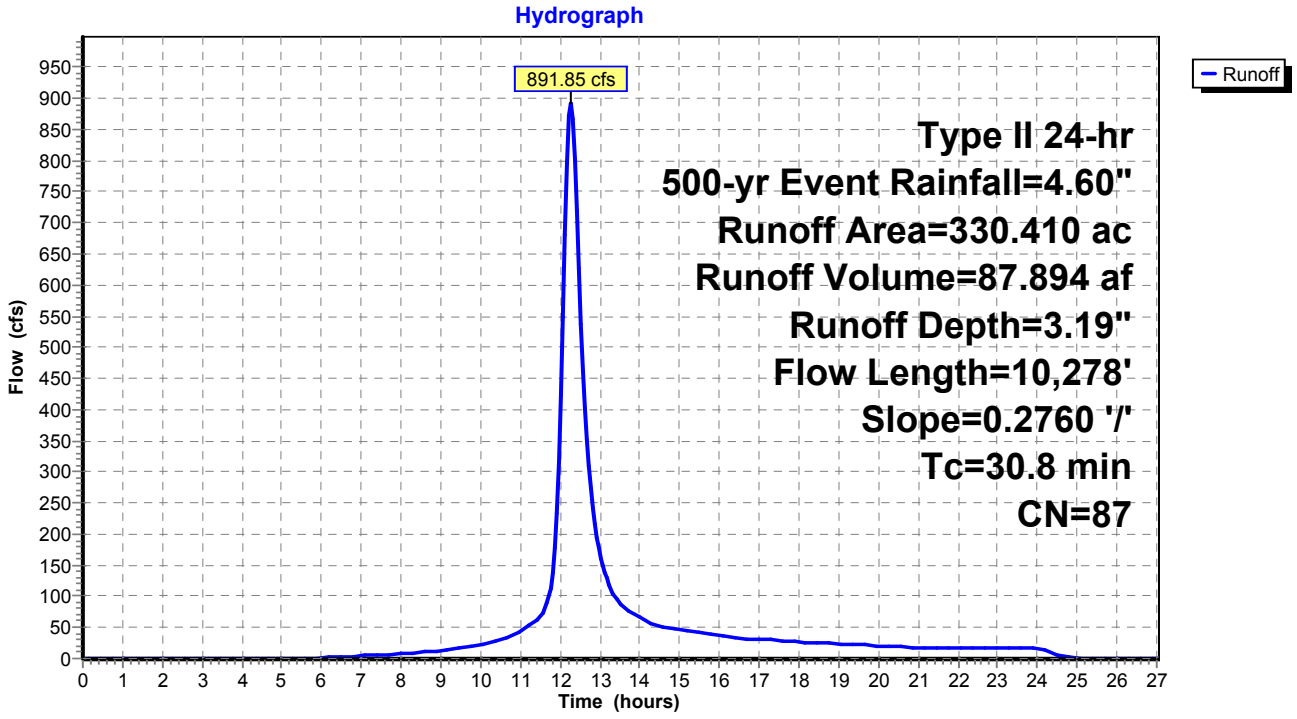
Runoff = 891.85 cfs @ 12.25 hrs, Volume= 87.894 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	297.370	86	Desert shrub range, Fair, HSG D
*	33.040	98	Impervious, HSG D
	330.410	87	Weighted Average
	297.370		90.00% Pervious Area
	33.040		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	10,278	0.2760	5.57		**Lag/CN Method,**

Subcatchment 10: WS 10



Summary for Subcatchment 11: WS 11

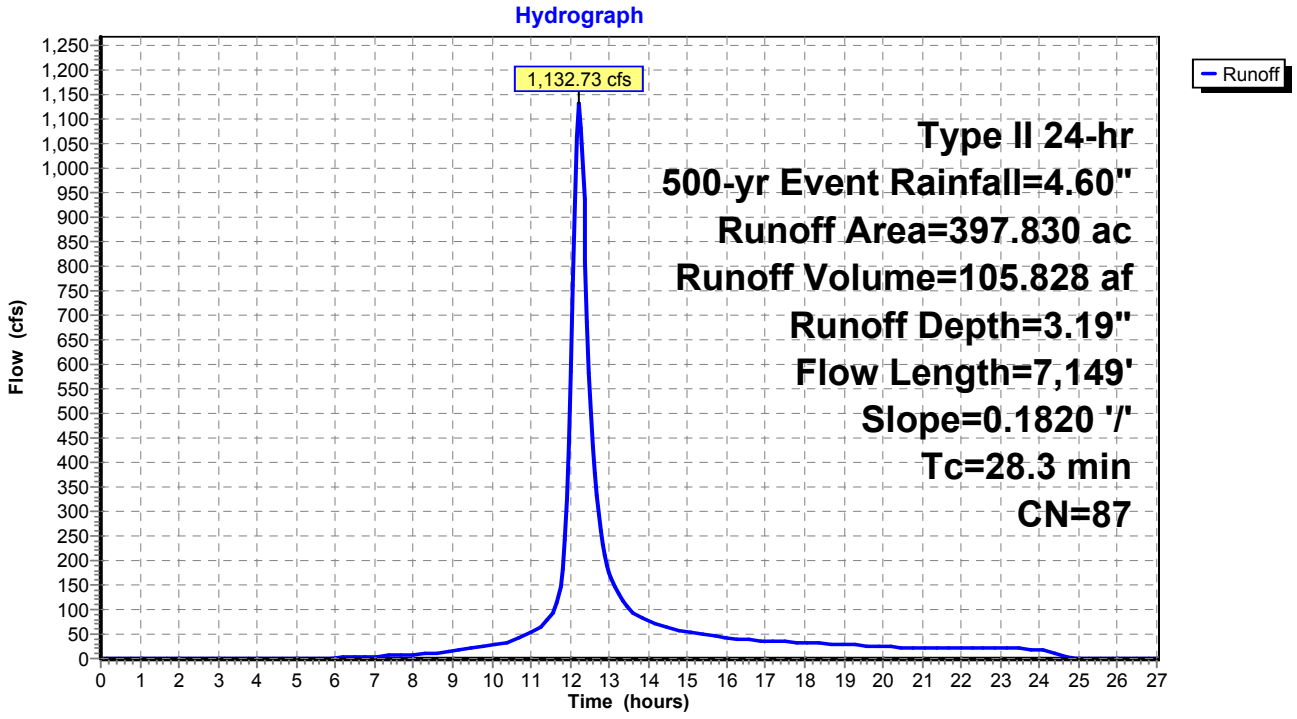
Runoff = 1,132.73 cfs @ 12.22 hrs, Volume= 105.828 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	358.050	86	Desert shrub range, Fair, HSG D
*	39.780	98	Impervious, HSG D
	397.830	87	Weighted Average
	358.050		90.00% Pervious Area
	39.780		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	7,149	0.1820	4.20		**Lag/CN Method,**

Subcatchment 11: WS 11



Summary for Subcatchment 12: WS 12

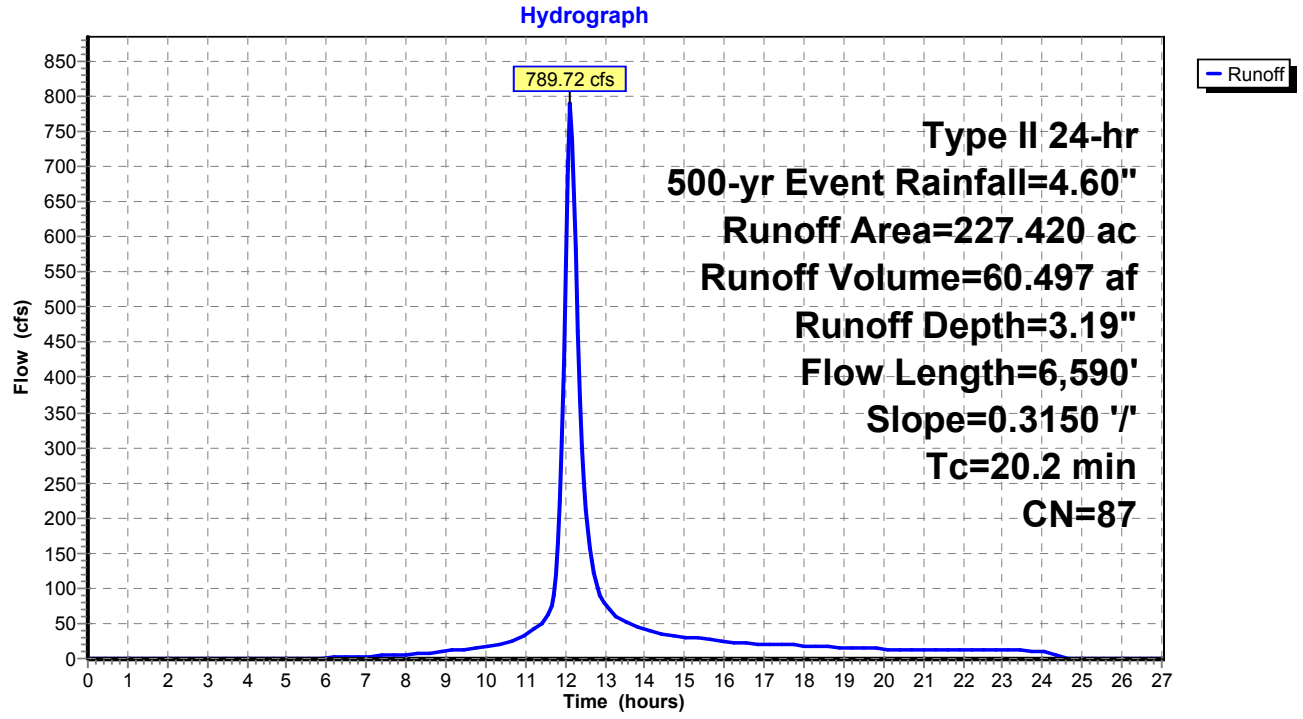
Runoff = 789.72 cfs @ 12.12 hrs, Volume= 60.497 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	204.680	86	Desert shrub range, Fair, HSG D
*	22.740	98	Impervious, HSG D
	227.420	87	Weighted Average
	204.680		90.00% Pervious Area
	22.740		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	6,590	0.3150	5.44		**Lag/CN Method,**

Subcatchment 12: WS 12



Summary for Subcatchment 13: WS 13

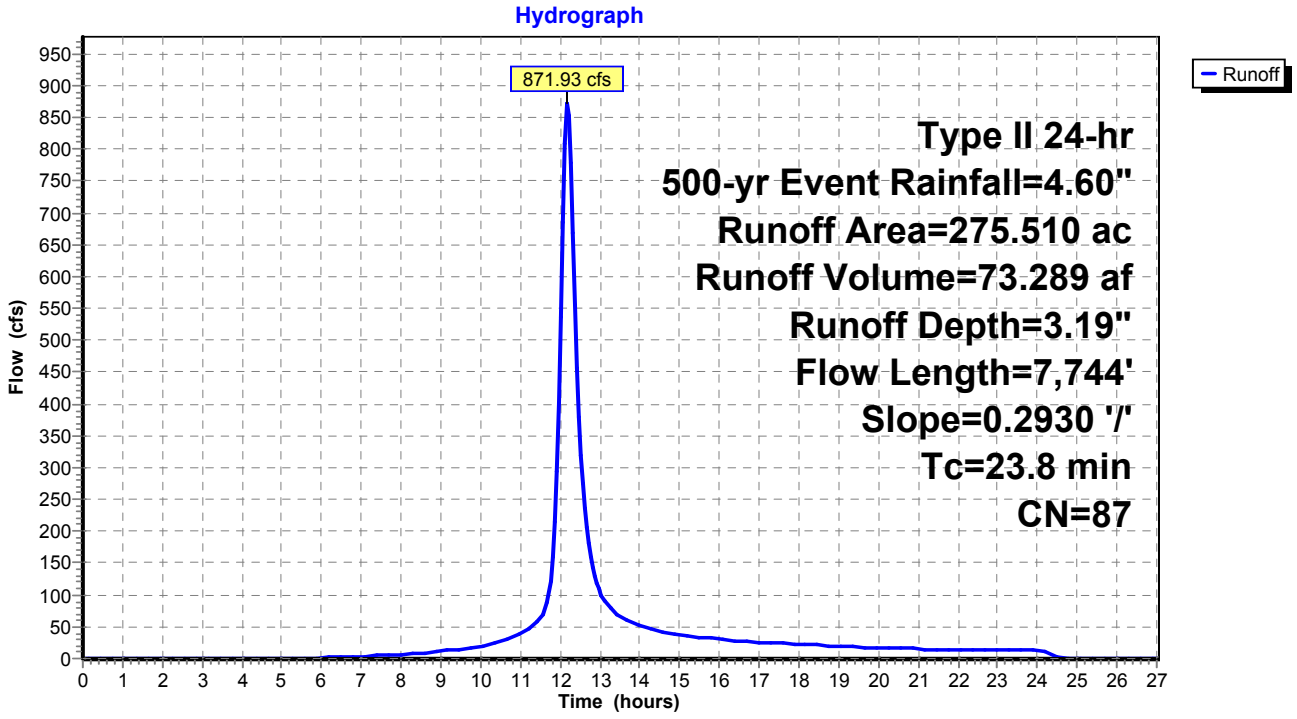
Runoff = 871.93 cfs @ 12.16 hrs, Volume= 73.289 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Type II 24-hr 500-yr Event Rainfall=4.60"

	Area (ac)	CN	Description
	247.960	86	Desert shrub range, Fair, HSG D
*	27.550	98	Impervious, HSG D
	275.510	87	Weighted Average
	247.960		90.00% Pervious Area
	27.550		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	7,744	0.2930	5.42		**Lag/CN Method,**

Subcatchment 13: WS 13



Summary for Reach CHNL 1: Channel 1

Inflow Area = 502.930 ac, 10.00% Impervious, Inflow Depth = 3.19" for 500-yr Event event
Inflow = 1,647.46 cfs @ 12.14 hrs, Volume= 133.786 af
Outflow = 1,601.86 cfs @ 12.23 hrs, Volume= 133.784 af, Atten= 3%, Lag= 5.4 min

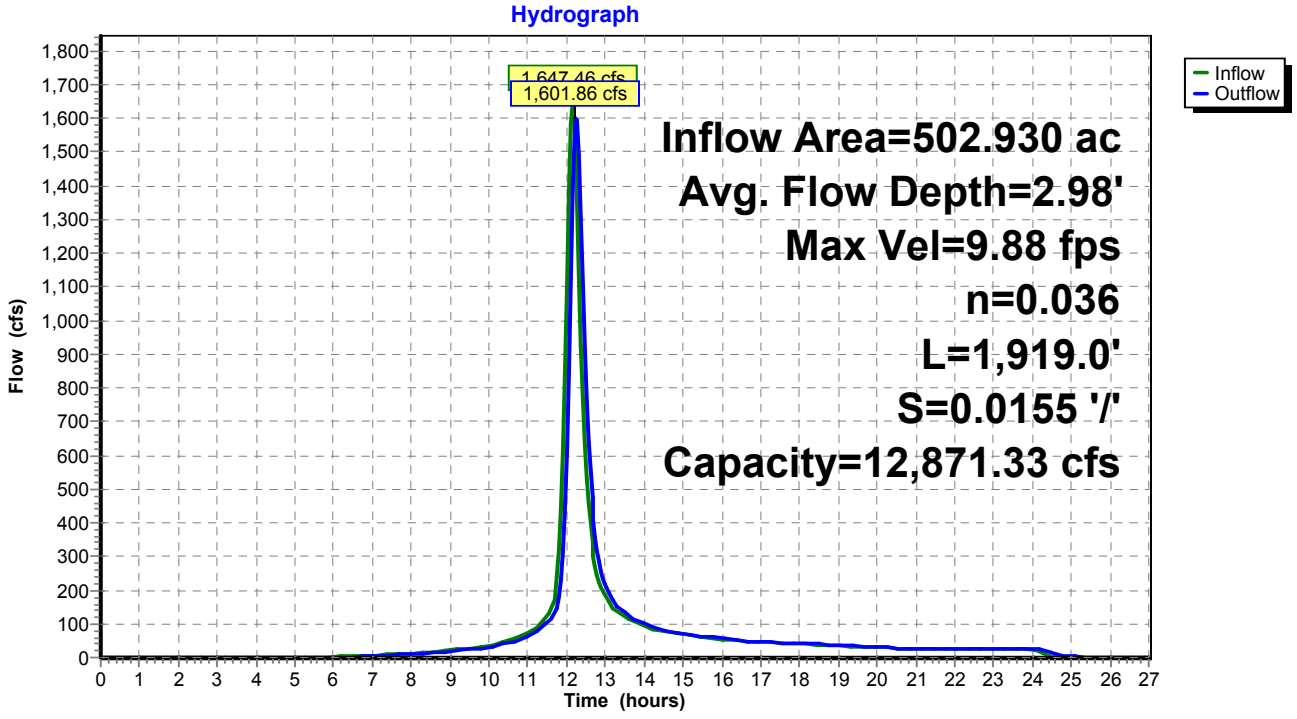
Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.88 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 2.42 fps, Avg. Travel Time= 13.2 min

Peak Storage= 311,381 cf @ 12.18 hrs
Average Depth at Peak Storage= 2.98'
Bank-Full Depth= 10.00' Flow Area= 650.0 sf, Capacity= 12,871.33 cfs

50.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 80.00'
Length= 1,919.0' Slope= 0.0155 '/'
Inlet Invert= 5,569.50', Outlet Invert= 5,539.70'

‡

Reach CHNL 1: Channel 1



Summary for Reach CHNL 2: Channel 2

Inflow Area = 870.220 ac, 10.00% Impervious, Inflow Depth = 3.19" for 500-yr Event event
Inflow = 2,597.10 cfs @ 12.14 hrs, Volume= 231.491 af
Outflow = 2,180.53 cfs @ 12.45 hrs, Volume= 231.028 af, Atten= 16%, Lag= 18.9 min

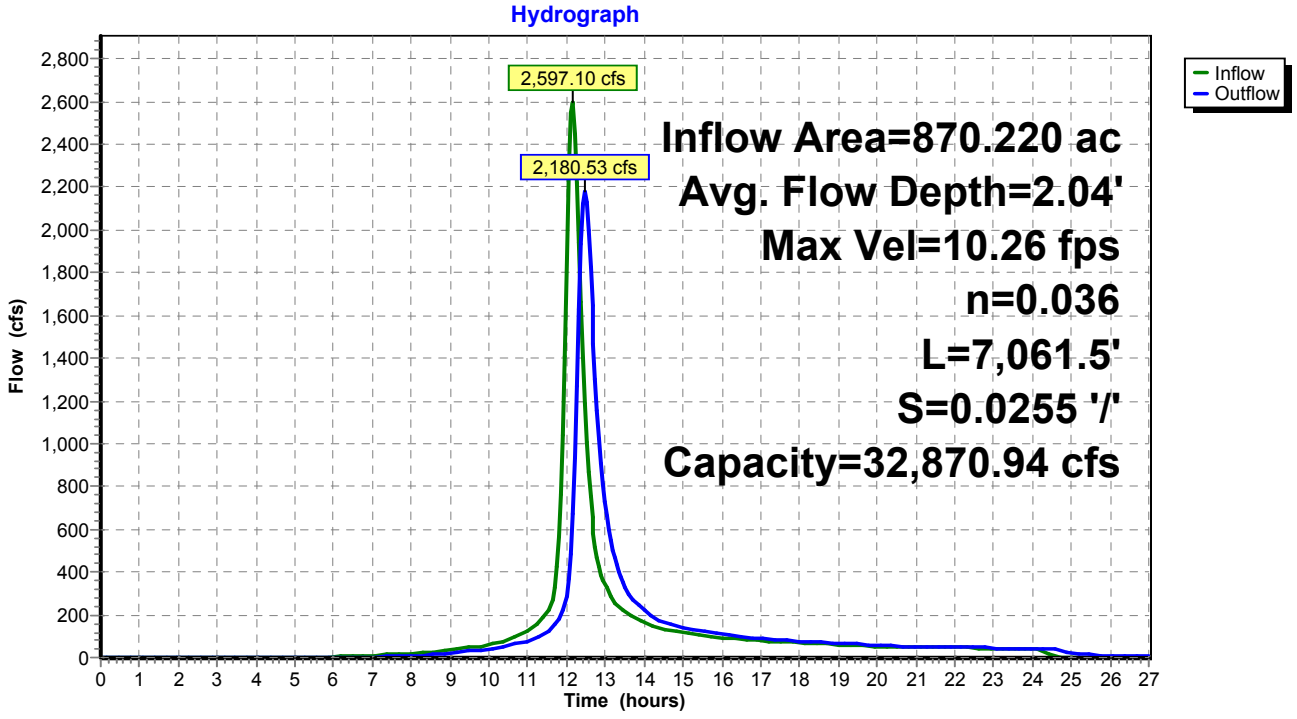
Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.26 fps, Min. Travel Time= 11.5 min
Avg. Velocity = 2.72 fps, Avg. Travel Time= 43.2 min

Peak Storage= 1,506,746 cf @ 12.26 hrs
Average Depth at Peak Storage= 2.04'
Bank-Full Depth= 10.00' Flow Area= 1,225.0 sf, Capacity= 32,870.94 cfs

100.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 2.5 2.0 '/' Top Width= 145.00'
Length= 7,061.5' Slope= 0.0255 '/'
Inlet Invert= 5,720.00', Outlet Invert= 5,539.70'

‡

Reach CHNL 2: Channel 2



Summary for Reach CHNL 3: Channel 3

[62] Hint: Exceeded Reach CHNL 1 OUTLET depth by 4.30' @ 12.45 hrs
[62] Hint: Exceeded Reach CHNL 2 OUTLET depth by 4.53' @ 12.35 hrs

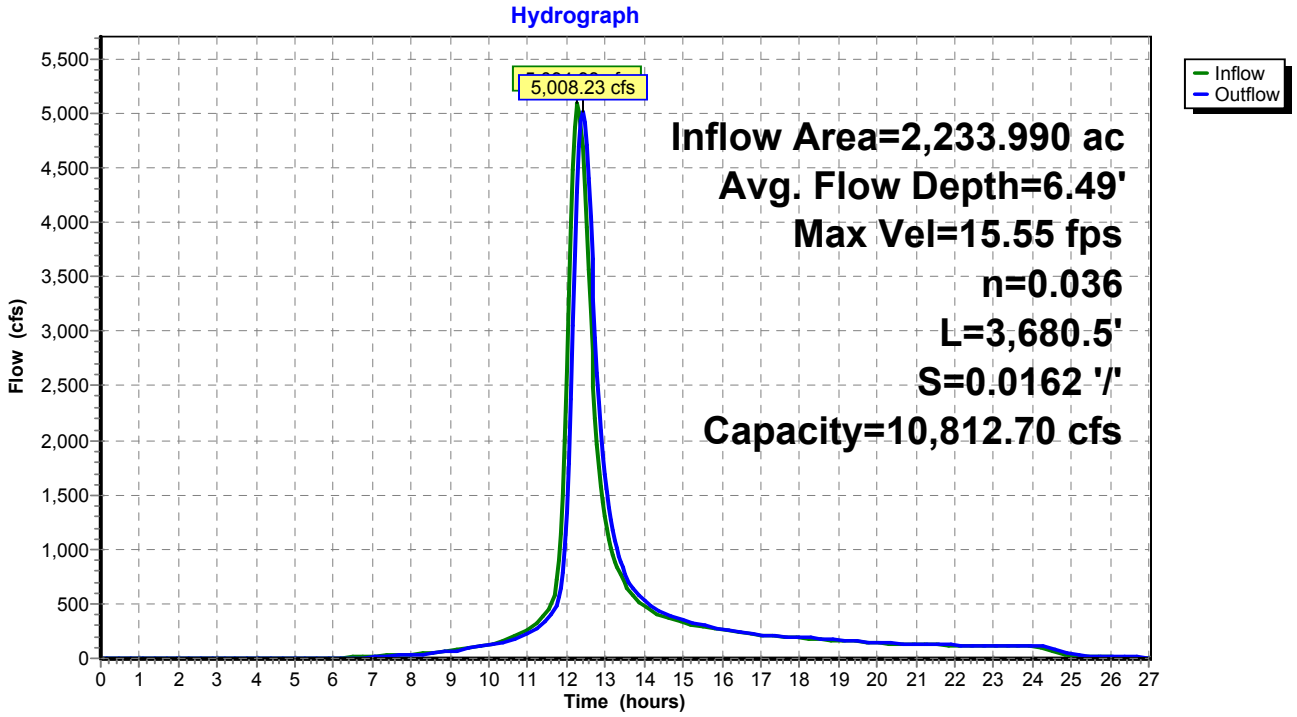
Inflow Area = 2,233.990 ac, 10.00% Impervious, Inflow Depth > 3.19" for 500-yr Event event
Inflow = 5,094.93 cfs @ 12.28 hrs, Volume= 593.807 af
Outflow = 5,008.23 cfs @ 12.40 hrs, Volume= 593.385 af, Atten= 2%, Lag= 6.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 15.55 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 4.58 fps, Avg. Travel Time= 13.4 min

Peak Storage= 1,188,451 cf @ 12.33 hrs
Average Depth at Peak Storage= 6.49'
Bank-Full Depth= 10.00' Flow Area= 550.0 sf, Capacity= 10,812.70 cfs

40.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 70.00'
Length= 3,680.5' Slope= 0.0162 '/'
Inlet Invert= 5,539.70', Outlet Invert= 5,480.00'

Reach CHNL 3: Channel 3



Summary for Reach CHNL 4: Channel 4

[61] Hint: Exceeded Reach CHNL 3 outlet invert by 4.57' @ 12.40 hrs

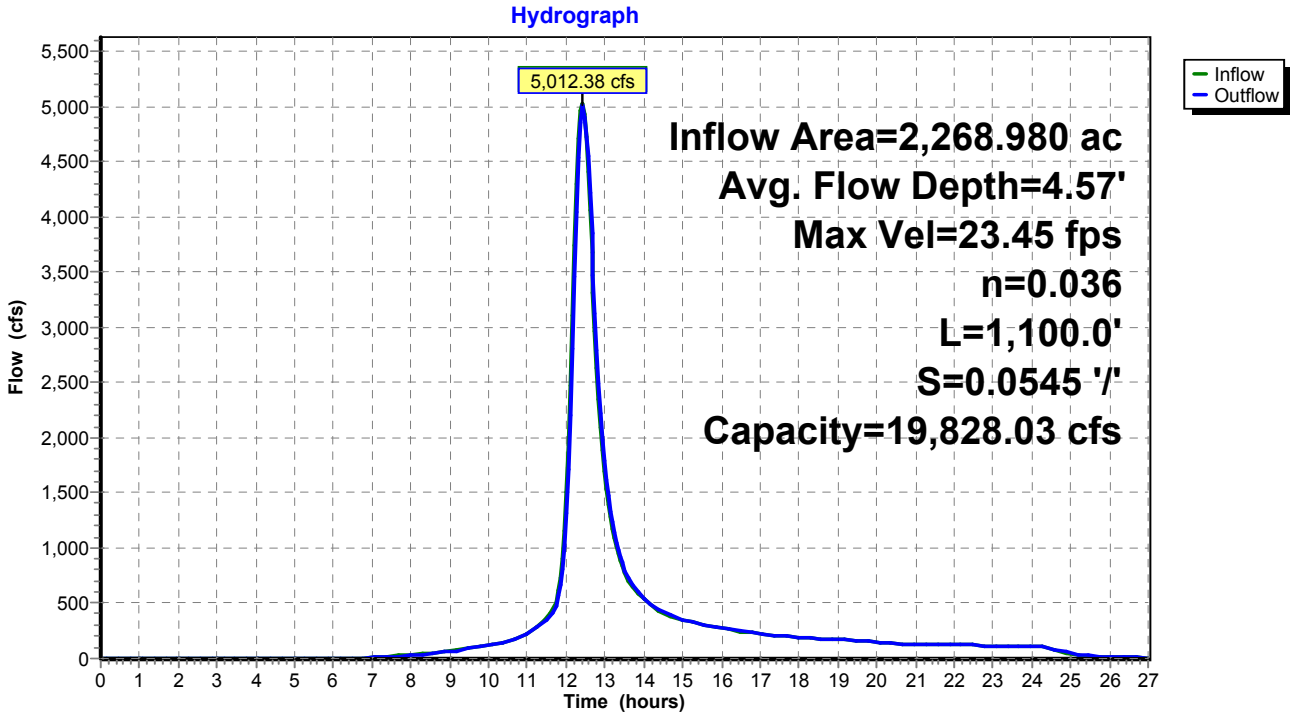
Inflow Area = 2,268.980 ac, 10.00% Impervious, Inflow Depth > 3.19" for 500-yr Event event
Inflow = 5,028.84 cfs @ 12.40 hrs, Volume= 602.692 af
Outflow = 5,012.38 cfs @ 12.42 hrs, Volume= 602.599 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 23.45 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 6.76 fps, Avg. Travel Time= 2.7 min

Peak Storage= 235,792 cf @ 12.41 hrs
Average Depth at Peak Storage= 4.57'
Bank-Full Depth= 10.00' Flow Area= 550.0 sf, Capacity= 19,828.03 cfs

40.00' x 10.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 70.00'
Length= 1,100.0' Slope= 0.0545 '/'
Inlet Invert= 5,480.00', Outlet Invert= 5,420.00'

Reach CHNL 4: Channel 4



Summary for Reach CHNL 5: Channel 5

[62] Hint: Exceeded Reach CHNL 4 OUTLET depth by 2.92' @ 12.50 hrs

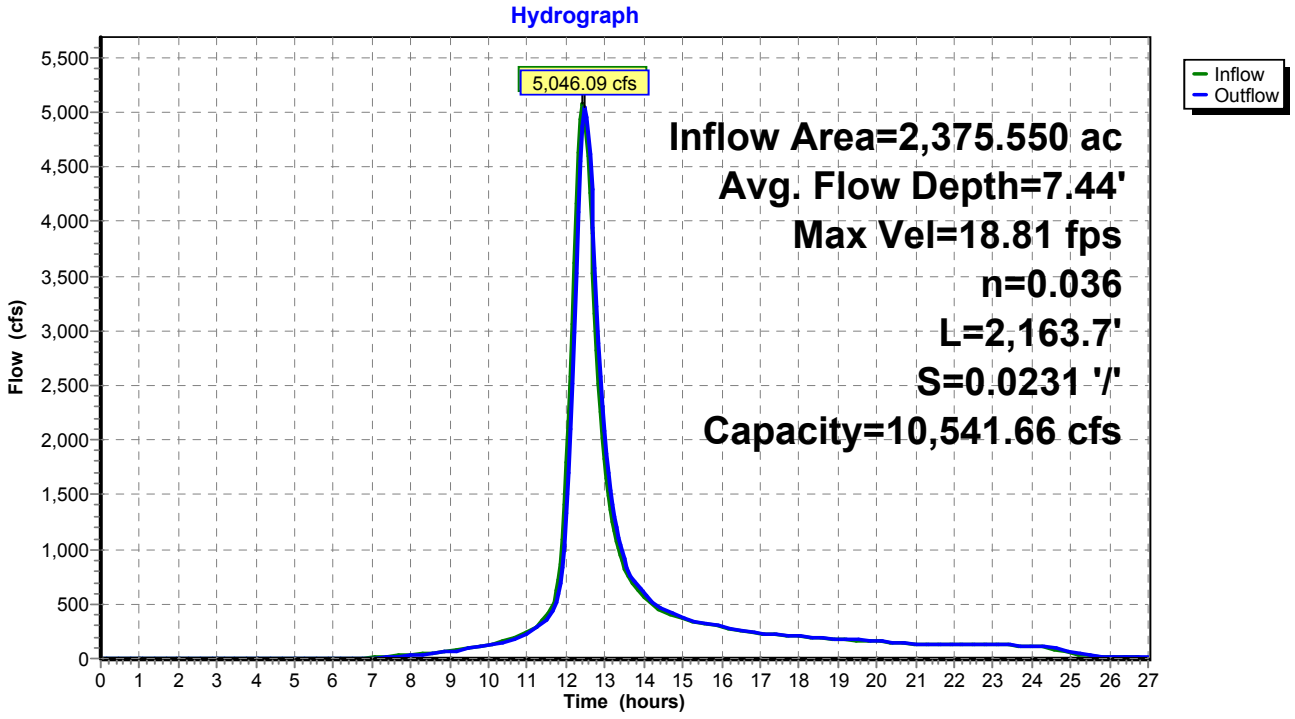
Inflow Area = 2,375.550 ac, 10.00% Impervious, Inflow Depth > 3.19" for 500-yr Event event
Inflow = 5,080.00 cfs @ 12.42 hrs, Volume= 630.949 af
Outflow = 5,046.09 cfs @ 12.47 hrs, Volume= 630.724 af, Atten= 1%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 18.81 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 6.05 fps, Avg. Travel Time= 6.0 min

Peak Storage= 582,162 cf @ 12.44 hrs
Average Depth at Peak Storage= 7.44'
Bank-Full Depth= 11.00' Flow Area= 456.5 sf, Capacity= 10,541.66 cfs

25.00' x 11.00' deep channel, n= 0.036
Side Slope Z-value= 1.5 '/' Top Width= 58.00'
Length= 2,163.7' Slope= 0.0231 '/'
Inlet Invert= 5,420.00', Outlet Invert= 5,370.00'

Reach CHNL 5: Channel 5



Summary for Pond CLVT 1: Culvert Crossing #1

[62] Hint: Exceeded Reach CHNL 5 OUTLET depth by 21.32' @ 12.80 hrs

Inflow Area = 2,375.550 ac, 10.00% Impervious, Inflow Depth > 3.19" for 500-yr Event event
Inflow = 5,046.09 cfs @ 12.47 hrs, Volume= 630.724 af
Outflow = 3,847.35 cfs @ 12.71 hrs, Volume= 630.580 af, Atten= 24%, Lag= 14.4 min
Primary = 3,847.35 cfs @ 12.71 hrs, Volume= 630.580 af

Routing by Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 5,397.29' @ 12.71 hrs Surf.Area= 0 sf Storage= 2,570,184 cf
Flood Elev= 5,419.00' Surf.Area= 0 sf Storage= 12,108,960 cf

Plug-Flow detention time= 5.1 min calculated for 629.414 af (100% of inflow)
Center-of-Mass det. time= 4.9 min (855.3 - 850.4)

Volume	Invert	Avail.Storage	Storage Description
#1	5,370.00'	12,108,960 cf	**Culvert Crossing #1** Listed below

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

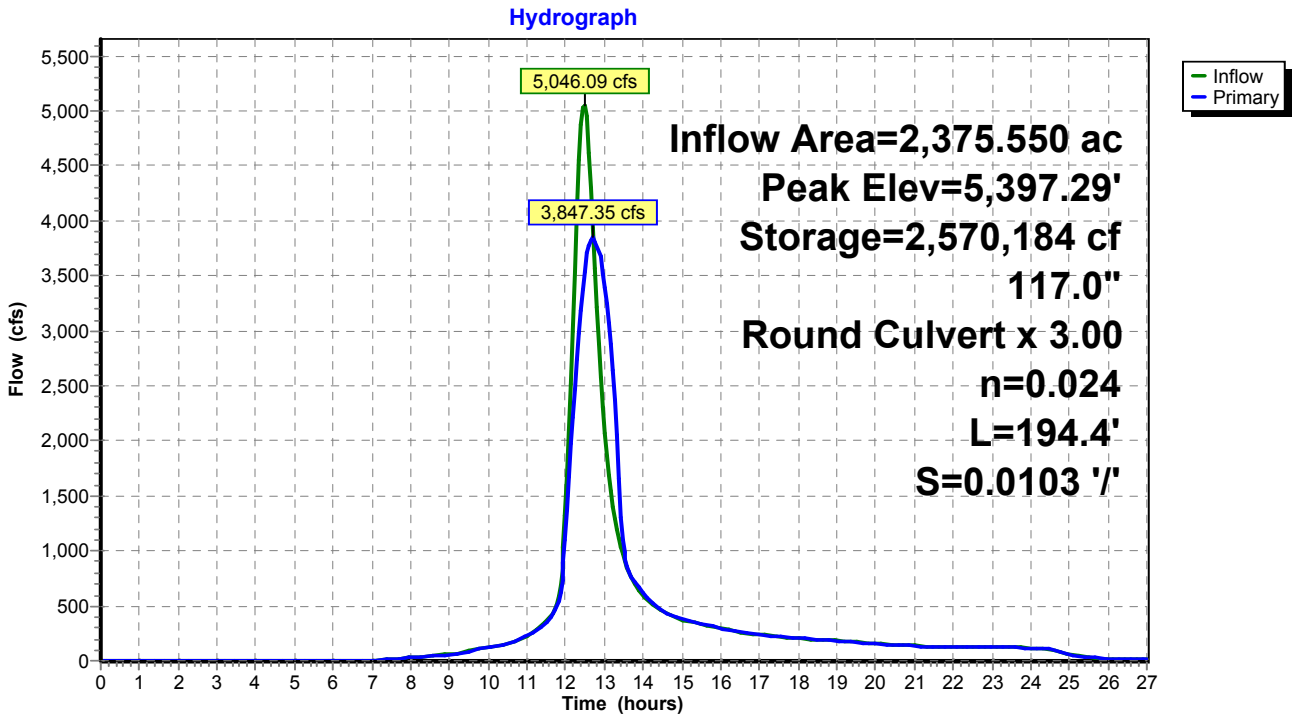
Elevation (feet)	Cum.Store (cubic-feet)
5,370.00	0
5,371.00	1,264
5,372.00	4,909
5,373.00	7,513
5,374.00	16,645
5,375.00	29,237
5,376.00	46,725
5,377.00	71,156
5,378.00	103,816
5,379.00	144,375
5,380.00	193,809
5,381.00	252,611
5,382.00	321,098
5,383.00	399,998
5,384.00	488,627
5,385.00	587,544
5,386.00	697,578
5,387.00	818,723
5,388.00	950,841
5,389.00	1,094,170
5,390.00	1,248,216
5,391.00	1,412,011
5,392.00	1,587,481
5,393.00	1,774,410
5,394.00	1,971,598
5,395.00	2,046,356
5,396.00	2,266,171
5,397.00	2,498,604
5,398.00	2,742,207
5,399.00	2,998,577
5,400.00	3,272,610
5,401.00	3,564,605
5,402.00	3,875,249
5,403.00	4,205,411
5,404.00	4,554,001
5,405.00	4,921,330
5,406.00	5,306,733
5,407.00	5,710,058
5,408.00	6,132,117
5,409.00	6,572,849
5,410.00	7,032,579
5,411.00	7,512,479
5,412.00	8,012,116
5,413.00	8,533,107
5,414.00	9,078,172
5,415.00	9,647,155
5,416.00	10,235,642
5,417.00	10,841,380
5,418.00	11,465,162
5,419.00	12,108,960

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

Device	Routing	Invert	Outlet Devices
#1	Primary	5,372.00'	**117.0" Round Culvert X 3.00** L= 194.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5,372.00' / 5,370.00' S= 0.0103 '/' Cc= 0.900 n= 0.024, Flow Area= 74.66 sf

Primary OutFlow Max=3,844.98 cfs @ 12.71 hrs HW=5,397.27' (Free Discharge)
1=Culvert (Inlet Controls 3,844.98 cfs @ 17.17 fps)

Pond CLVT 1: Culvert Crossing #1



Summary for Pond CLVT 2: Culvert Crossing #2

[81] Warning: Exceeded Pond CLVT 1 by 17.33' @ 13.50 hrs

Inflow Area = 2,403.760 ac, 10.00% Impervious, Inflow Depth > 3.19" for 500-yr Event event
Inflow = 3,856.73 cfs @ 12.71 hrs, Volume= 638.084 af
Outflow = 1,791.19 cfs @ 13.33 hrs, Volume= 638.031 af, Atten= 54%, Lag= 37.4 min
Primary = 1,791.19 cfs @ 13.33 hrs, Volume= 638.031 af

Routing by Stor-Ind method, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 5,396.71' @ 13.33 hrs Surf.Area= 0 sf Storage= 8,137,086 cf
Flood Elev= 5,403.00' Surf.Area= 0 sf Storage= 10,142,539 cf

Plug-Flow detention time= 36.3 min calculated for 636.852 af (100% of inflow)
Center-of-Mass det. time= 36.2 min (890.9 - 854.7)

Volume	Invert	Avail.Storage	Storage Description
#1	5,352.00'	10,142,539 cf	**Existing Pond** Listed below

Exist WS (Post-Quintana)_Culvert Analysis *Type II 24-hr 500-yr Event Rainfall=4.60"*
Prepared by M3 Engineering Printed 11/24/2015

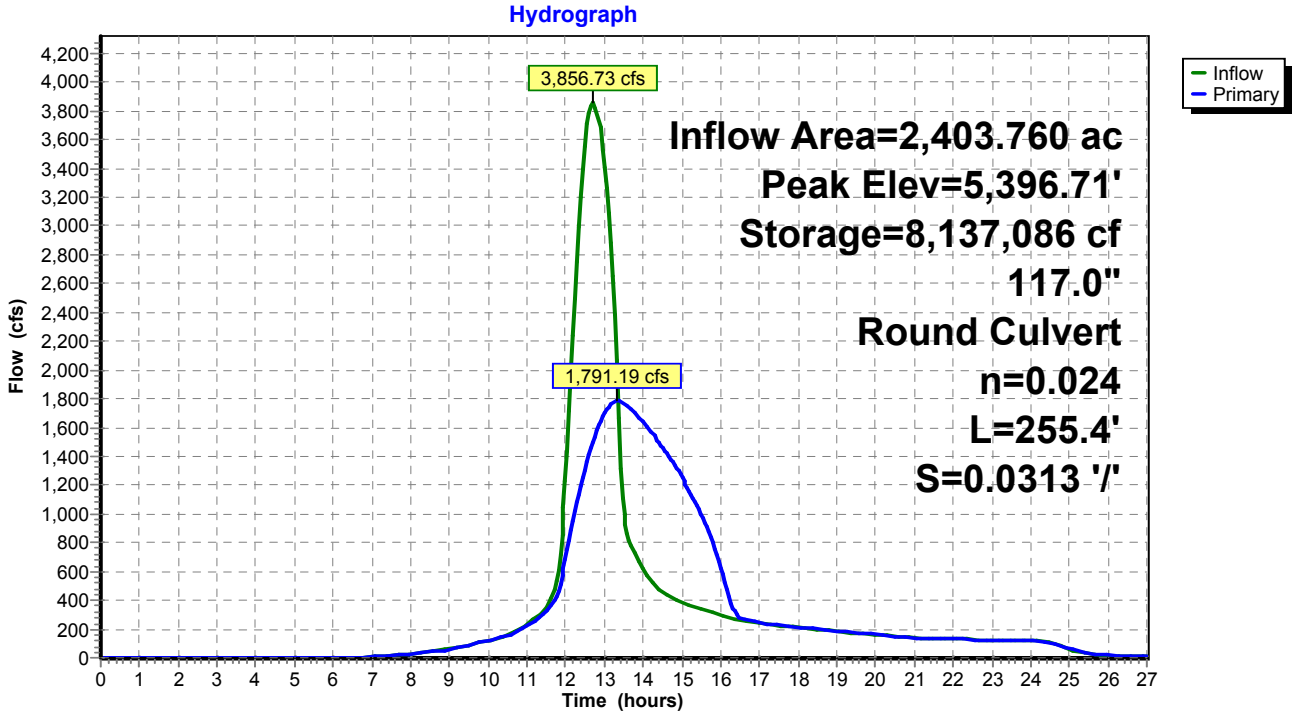
Elevation (feet)	Cum.Store (cubic-feet)
5,352.00	0
5,353.00	2,681
5,354.00	7,382
5,355.00	15,397
5,356.00	28,286
5,357.00	47,224
5,358.00	75,773
5,359.00	117,133
5,360.00	170,345
5,361.00	235,331
5,362.00	312,331
5,363.00	399,765
5,364.00	497,494
5,365.00	605,663
5,366.00	724,610
5,367.00	855,928
5,368.00	1,000,315
5,369.00	1,157,122
5,370.00	1,325,832
5,371.00	1,505,243
5,372.00	1,693,878
5,373.00	1,890,808
5,374.00	2,095,234
5,375.00	2,306,959
5,376.00	2,525,755
5,377.00	2,751,367
5,378.00	2,983,426
5,379.00	3,221,478
5,380.00	3,465,168
5,381.00	3,714,247
5,382.00	3,968,434
5,383.00	4,227,291
5,384.00	4,490,405
5,385.00	4,757,518
5,386.00	5,028,418
5,387.00	5,302,894
5,388.00	5,580,732
5,389.00	5,861,867
5,390.00	6,146,219
5,391.00	6,433,776
5,392.00	6,724,543
5,393.00	7,018,534
5,394.00	7,315,762
5,395.00	7,616,273
5,396.00	7,920,106
5,397.00	8,227,290
5,398.00	8,537,855
5,399.00	8,851,826
5,400.00	9,169,229
5,401.00	9,490,117

5,402.00	9,814,540
5,403.00	10,142,539

Device	Routing	Invert	Outlet Devices
#1	Primary	5,352.00'	**117.0" Round Culvert** L= 255.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5,352.00' / 5,344.00' S= 0.0313 '/' Cc= 0.900 n= 0.024, Flow Area= 74.66 sf

Primary OutFlow Max=1,790.68 cfs @ 13.33 hrs HW=5,396.68' (Free Discharge)
└**1=Culvert** (Inlet Controls 1,790.68 cfs @ 23.98 fps)

Pond CLVT 2: Culvert Crossing #2



APPENDIX E

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 3552.39 cfs

Maximum Flow: 3552.39 cfs

Table 1 - Summary of Culvert Flows at Crossing: Crossing #1 (Q100)

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
5379.00	0.00	0.00	0.00	1
5379.14	355.24	355.24	0.00	1
5379.56	710.48	710.48	0.00	1
5380.24	1065.72	1065.72	0.00	1
5381.15	1420.96	1420.96	0.00	1
5382.25	1776.19	1776.19	0.00	1
5383.46	2131.43	2131.43	0.00	1
5384.93	2486.67	2486.67	0.00	1
5386.88	2841.91	2841.91	0.00	1
5389.10	3197.15	3197.15	0.00	1
5391.64	3552.39	3552.39	0.00	1
5419.00	6067.40	6067.40	0.00	Overtopping

Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
	0.00	0.00	5379.00	0.000	7.000	0-NF	0.000	0.000	9.000	9.000	0.000
	355.24	355.24	5379.14	3.732	7.141	1-S1t	2.429	2.542	9.000	9.000	1.661
	710.48	710.48	5379.56	5.429	7.560	1-S1t	3.514	3.636	9.000	9.000	3.322
	1065.72	1065.72	5380.24	6.895	8.241	1-S1t	4.391	4.498	9.000	9.000	4.983
	1420.96	1420.96	5381.15	8.285	9.153	1-S1t	5.196	5.224	9.000	9.000	6.645
	1776.19	1776.19	5382.25	9.701	10.246	7-M1t	5.989	5.872	9.000	9.000	8.221
	2131.43	2131.43	5383.46	11.227	11.459	7-M1t	6.823	6.452	9.000	9.000	9.865
	2486.67	2486.67	5384.93	12.934	12.754	7-M1t	7.797	6.982	9.000	9.000	11.509
	2841.91	2841.91	5386.88	14.878	14.187	3-M2t	9.750	7.458	9.000	9.000	13.153
	3197.15	3197.15	5389.10	17.102	16.162	7-M2t	9.750	7.882	9.000	9.000	14.797
	3552.39	3552.39	5391.64	19.638	18.453	7-M2t	9.750	8.252	9.000	9.000	16.441

****

Straight Culvert

Inlet Elevation (invert): 5372.00 ft, Outlet Elevation (invert): 5370.00 ft

Culvert Length: 194.41 ft, Culvert Slope: 0.0103

****

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 5372.00 ft

Outlet Station: 194.40 ft

Outlet Elevation: 5370.00 ft

Number of Barrels: 3

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 9.75 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: Crossing #1 (Q100))

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	5379.00	9.00
355.24	5379.00	9.00
710.48	5379.00	9.00
1065.72	5379.00	9.00
1420.96	5379.00	9.00
1776.19	5379.00	9.00
2131.43	5379.00	9.00
2486.67	5379.00	9.00
2841.91	5379.00	9.00
3197.15	5379.00	9.00
3552.39	5379.00	9.00

Tailwater Channel Data - Crossing #1 (Q100)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 5379.00 ft

Roadway Data for Crossing: Crossing #1 (Q100)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 60.00 ft

Crest Elevation: 5419.00 ft

Roadway Surface: Paved

Roadway Top Width: 57.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 4191.95 cfs

Maximum Flow: 4191.95 cfs

Table 4 - Summary of Culvert Flows at Crossing: Crossing #1 (Q200)

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
5379.00	0.00	0.00	0.00	1
5379.20	419.19	419.19	0.00	1
5379.78	838.39	838.39	0.00	1
5380.71	1257.59	1257.59	0.00	1
5381.93	1676.78	1676.78	0.00	1
5383.33	2095.97	2095.97	0.00	1
5385.08	2515.17	2515.17	0.00	1
5387.43	2934.36	2934.36	0.00	1
5390.18	3353.56	3353.56	0.00	1
5393.38	3772.76	3772.76	0.00	1
5397.05	4191.95	4191.95	0.00	1
5419.00	6067.40	6067.40	0.00	Overtopping

Table 5 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
	0.00	0.00	5379.00	0.000	7.000	0-NF	0.000	0.000	9.000	9.000	0.000
	419.19	419.19	5379.20	4.077	7.197	1-S1t	2.671	2.769	9.000	9.000	1.960
	838.39	838.39	5379.78	5.973	7.777	1-S1t	3.833	3.962	9.000	9.000	3.920
	1257.59	1257.59	5380.71	7.648	8.708	1-S1t	4.827	4.903	9.000	9.000	5.881
	1676.78	1676.78	5381.93	9.297	9.926	7-M1t	5.767	5.696	9.000	9.000	7.761
	2095.97	2095.97	5383.33	11.067	11.334	7-M1t	6.738	6.397	9.000	9.000	9.701
	2515.17	2515.17	5385.08	13.080	12.862	7-M1t	7.879	7.022	9.000	9.000	11.641
	2934.36	2934.36	5387.43	15.428	14.613	3-M2t	9.750	7.573	9.000	9.000	13.581
	3353.56	3353.56	5390.18	18.179	17.154	7-M2t	9.750	8.052	9.000	9.000	15.521
	3772.76	3772.76	5393.38	21.377	19.962	7-M2t	9.750	8.453	9.000	9.000	17.461
	4191.95	4191.95	5397.05	25.048	23.060	7-M2t	9.750	8.776	9.000	9.000	19.402

****

Straight Culvert

Inlet Elevation (invert): 5372.00 ft, Outlet Elevation (invert): 5370.00 ft

Culvert Length: 194.41 ft, Culvert Slope: 0.0103

****

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 5372.00 ft

Outlet Station: 194.40 ft

Outlet Elevation: 5370.00 ft

Number of Barrels: 3

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 9.75 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Table 6 - Downstream Channel Rating Curve (Crossing: Crossing #1 (Q200))

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	5379.00	9.00
419.19	5379.00	9.00
838.39	5379.00	9.00
1257.59	5379.00	9.00
1676.78	5379.00	9.00
2095.97	5379.00	9.00
2515.17	5379.00	9.00
2934.36	5379.00	9.00
3353.56	5379.00	9.00
3772.76	5379.00	9.00
4191.95	5379.00	9.00

Tailwater Channel Data - Crossing #1 (Q200)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 5379.00 ft

Roadway Data for Crossing: Crossing #1 (Q200)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 60.00 ft

Crest Elevation: 5419.00 ft

Roadway Surface: Paved

Roadway Top Width: 57.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 5046.09 cfs

Maximum Flow: 5046.09 cfs

Table 7 - Summary of Culvert Flows at Crossing: Crossing #1 (Q500)

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
5379.00	0.00	0.00	0.00	1
5379.28	504.61	504.61	0.00	1
5380.12	1009.22	1009.22	0.00	1
5381.42	1513.83	1513.83	0.00	1
5383.06	2018.44	2018.44	0.00	1
5385.12	2523.05	2523.05	0.00	1
5388.00	3027.65	3027.65	0.00	1
5391.49	3532.26	3532.26	0.00	1
5395.63	4036.87	4036.87	0.00	1
5400.48	4541.48	4541.48	0.00	1
5406.01	5046.09	5046.09	0.00	1
5419.00	6067.41	6067.41	0.00	Overtopping

Table 8 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
	0.00	0.00	5379.00	0.000	7.000	0-NF	0.000	0.000	9.000	9.000	0.000
	504.61	504.61	5379.28	4.496	7.284	1-S1t	2.918	3.045	9.000	9.000	2.360
	1009.22	1009.22	5380.12	6.670	8.116	1-S1t	4.252	4.370	9.000	9.000	4.719
	1513.83	1513.83	5381.42	8.649	9.424	3-M1t	5.404	5.401	9.000	9.000	7.006
	2018.44	2018.44	5383.06	10.725	11.064	7-M1t	6.552	6.274	9.000	9.000	9.342
	2523.05	2523.05	5385.12	13.121	12.892	7-M1t	7.902	7.033	9.000	9.000	11.677
	3027.65	3027.65	5388.00	16.003	15.097	3-M2t	9.750	7.686	9.000	9.000	14.013
	3532.26	3532.26	5391.49	19.485	18.319	7-M2t	9.750	8.233	9.000	9.000	16.348
	4036.87	4036.87	5395.63	23.634	21.878	7-M2t	9.750	8.665	9.000	9.000	18.684
	4541.48	4541.48	5400.48	28.477	25.882	7-M2t	9.750	8.986	9.000	9.000	21.019
	5046.09	5046.09	5406.01	34.012	30.317	7-M2c	9.750	9.218	9.218	9.000	23.018

****

Straight Culvert

Inlet Elevation (invert): 5372.00 ft, Outlet Elevation (invert): 5370.00 ft

Culvert Length: 194.41 ft, Culvert Slope: 0.0103

****

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 5372.00 ft

Outlet Station: 194.40 ft

Outlet Elevation: 5370.00 ft

Number of Barrels: 3

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 9.75 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Table 9 - Downstream Channel Rating Curve (Crossing: Crossing #1 (Q500))

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	5379.00	9.00
504.61	5379.00	9.00
1009.22	5379.00	9.00
1513.83	5379.00	9.00
2018.44	5379.00	9.00
2523.05	5379.00	9.00
3027.65	5379.00	9.00
3532.26	5379.00	9.00
4036.87	5379.00	9.00
4541.48	5379.00	9.00
5046.09	5379.00	9.00

Tailwater Channel Data - Crossing #1 (Q500)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 5379.00 ft

Roadway Data for Crossing: Crossing #1 (Q500)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 60.00 ft

Crest Elevation: 5419.00 ft

Roadway Surface: Paved

Roadway Top Width: 57.00 ft