Stormwater Management Compliance Report

For
Blaze Mill Townhouse Development

Plate 141, Block 14101, Lot 1
Plate 141.06, Block 141.0602, Lot 1.01
Monroe Township, Gloucester County, New Jersey

July 31, 2014
Revised July 31, 2015
Revised November 2, 2015

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NARRATIVE AND SUMMARY

1.0 PROJECT DESCRIPTION

Blaze Mill Development Group, LLC (Applicant) is seeking Preliminary Subdivision Plan Approval from Monroe Township for the construction of a townhouse dwelling unit development consisting of the following:

- Two hundred fifty (244) market rate townhouse units with driveways and garages;
- Four open space lots on which two open space lots will support stormwater management facility basins to be owned and maintained by a Homeowners Association;
- Five Medium Intensity Neighborhood Streets with a 50 foot wide right of way and a 30 foot wide cartway and five Multifamily Courts with a 50 foot right of way width and a 30 foot wide cartway to be dedicated to Monroe Township;
- Basins 1 and 2 are designed as infiltration basins to address the groundwater recharge requirements, water quality and quantity control. Basin 3 is designed as a wet pond;
- Required roadway improvements to Fries Mill Road, Gloucester County Route 655 and U.S. Route 322.

The proposed improvements will be constructed on Block 14101, Lots 1 and Block 141.0602, Lot 1.01 as indicated on the official Tax Map of Monroe Township, Gloucester County, New Jersey (See **FIGURE MAP 1**). The proposed development is bounded by Fries Mill Road, Gloucester County Route 655, to the west, U.S. Route 322 to the north and Hunter Woods, a single family detached dwelling unit subdivision to the east and south. The tract contains 62.21 acres of land to the existing right of way lines and 61.54 acres to the proposed right of way lines. 48.42 acres will be developed as part of this townhouse development and 13.12 acres will be reserved for future commercial development. Zoning for the proposed project is identified as MU Mixed Use as per a settlement agreement between Blaze Mill Development Group, LLC and Monroe Township. (See **FIGURE MAP 2**).

Topography ranges from elevation 154 feet to elevation 127 feet. Vertical datum is based on North American Vertical Datum (N.A.V.D.) 1988, (See **FIGURE MAP 3** and the **Grading Plans** within the Preliminary Subdivision Plans).

The proposed development is located within flood zone X as mapped on the Federal Emergency Management Agency Flood Insurance Rate Map, Community Panel No. 34015C 0208E (208 of 320) effective date and last revised January 20, 2010 for the Township of Monroe, Gloucester County, New Jersey (See **FIGURE MAP 4**).

The proposed construction area of the project is located on underlying Woodstown Sandy Loam Soil, type "C", Aura and Downer Sandy Loam Soil, type "B" and Pits, Sand and Gravel (See **FIGURE MAP 5** and the **Erosion and Sediment Control Plans** within the Preliminary Subdivision Plans).

The proposed stormwater design will consist of storm sewer improvements and the construction of three (3) on site stormwater management basins. Basins 1 and 2 are designed as infiltration basins to address the groundwater recharge requirements, water quality and quantity control. Basin 3 is designed as a wet pond.

All stormwater design and construction associated with the proposed project shall be in accordance with the requirements set forth with in New Jersey Administrative Code (N.J.A.C. 7:8) and Monroe Township.

2.0 DESIGN CRITERIA

'Major Developments' that require a stormwater review must comply with the Stormwater Regulations provided in N.J.A.C. 7:8 and the requirements of Monroe Township. A Major Development is defined as a development which ultimately disturbs one or more acres of land or increases impervious coverage by one-quarter of an acre or more.

The requirements for stormwater management within N.J.A.C 7:8 which affect the proposed development are runoff quantity, quality and groundwater recharge. Runoff quantity calculations are required to demonstrate attenuation of post development peak stormwater runoff rates to the required pre-construction peak runoff rates for the 2, 10 and 100 storm events. The runoff quality requirements are required for Major Developments that create an increase of one-quarter acre or more of impervious surfaces. The groundwater recharge requirement is applicable to all sites unless they meet exceptions listed in N.J.A.C. 7:8-5.4(a) 2.iii.

The following criteria apply to the proposed Development:

Stormwater Runoff Quantity Standards

- In accordance with N.J.A.C. 7:8-5.4 (a) 3 iii, runoff quantity calculations are required to demonstrate that the post-construction peak runoff rates for the 2, 10 and 100 storm events are 50, 75 and 80 percent respectively, of the pre-construction peak runoff rates. The percentage only applies to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development is to be constructed.

Stormwater Runoff Quality Standards

- In accordance with N.J.A.C. 7:8-5.5, the water quality regulations require the removal of 80% of the Total Suspended Solids (TSS) from the water quality storm (defined as 1.25 inches of rainfall over 2 hours), and the removal of nutrients to the maximum extent feasible or be designed to store a minimum three (3) times the water volume produced from the water quality storm event within the permanent pool volume. The TSS and nutrient removal can be accomplished with a variety of structural and non-structural Best Management Practices (BMPs) provided in the regulations.
- There shall be no direct discharge of stormwater runoff from any point or non-point source to any wetlands, wetlands transition area, or surface waterbody.
- Stormwater management measures shall also be designed to reduce the nutrient load in the stormwater runoff from the post-development site by the maximum extent practicable. In achieving this reduction, the design of the development site shall include nonstructural and structural stormwater management measures that optimize nutrient removal while still achieving the groundwater recharge, runoff quantity and rate, and TSS removal standards in this section.
- A Low Impact Development Checklist is included herein under the BMP Checklist and identifies nonstructural stormwater management strategies incorporated into the proposed land development.

Groundwater Recharge Standards

- As required by N.J.A.C. 7:8-5.4(a) 1, demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual pre-construction groundwater recharge volume for the site.

Erosion Control Standards

- The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and its implementation regulations, N.J.A.C. 2:90-1.1 through 1.4.

As demonstrated in this report the stormwater management facilities are designed in accordance with the Stormwater Management regulations stated in N.J.A.C. 7:8, the New Jersey Stormwater Best Management Practices (BMP) Manual, Monroe Township and the requirements set forth in Standards for Soil Erosion and Sediment Control in New Jersey.

3.0 TECHNIQUES OF ANALYSIS

The Natural Resources Conservation Service Technical Release 55 (TR-55) method was used in calculating pre and post-developed site runoff rates for various storms utilizing the Delmarva unit hydrograph. This technique is outlined in N.J.A.C. 7:8 and the Delmarva unit hydrograph applies to this site as described in the New Jersey Department of Environmental Protection (NJDEP) Bulletin No. NJ-210-3-1; being in the coastal plain region with slopes less than 5%, low relief and storage area in depressions. Time of concentration (Tc) was determined for pre and post-developed conditions using the hydraulically longest flow path. The Tc flow path can be found on the Drainage Area Maps located in Appendix E. The pre and post developed Tc calculations can be found in Appendix C.

Curve numbers (CN) were generated for the drainage areas for pre and post-developed conditions based on the soil group and land use. The CN calculations can be found in Appendix C for the respective routings. Note that impervious areas directly connected to the stormwater basins via storm sewer or overland flow, were calculated as separate subareas to generate hydrographs without weighted CN's as outlined in the BMP manual chapter 5. Using the drainage areas, the Tc's, and the CN's as input data, the computer program Hydraflow Hydrographs 2007 by Intelisolve, utilizing TR-55, was used to generate site runoff values in pre and post-developed conditions (Appendix C).

Storm sewer calculations were based on the Rational Method (Q = C x I x A). A storm event of twenty-five (25) years with the calculated time of concentration was utilized as required by the New Jersey Residential Site Improvement Standards and Delran Township. "C" values were developed for the various land use conditions. All proposed storm sewer pipes were modeled as RCP using an "n" factor of 0.013. Refer to Appendix A for all storm sewer calculations.

The Natural Resources Conservation Service Technical Release 55 (TR-55) method was used in calculating the culvert design under proposed Road A.

For maintenance procedures of the storm sewer system (inlets, manholes, storm pipe, endwalls and flared end sections and basins) refer to Stormwater Management Facilities Maintenance Manual.

4.0 INFILTRATION BASINS

The proposed Infiltration Basins 1 and 2 as demonstrated within this report will accommodate and infiltrate the water quality storm event and the ground water recharge requirement as well as attenuate the two (2), ten (10) and one hundred (100) year storm events.

According to Chapter 9.4 of the BMP Manual the lowest elevation in an infiltration basin must be at least two (2) feet above the seasonal high groundwater table. Soil borings were performed in the locations shown in Appendix C.

BASIN BOTTOM SEPARATION TO ESTIMATED SEASONAL HIGH WATER TABLE

- The borings in the area of proposed Stormwater Basin Number 1 indicates that an estimated seasonal high water elevation was not encountered. The bottom of Basin Number 1 has been designed with a bottom elevation of 131.00 feet above mean sea level, providing the minimum State requirement of two (2) feet separation since an estimated seasonal high water table was not encountered.

- The borings in the area of proposed Stormwater Basin Number 2 indicates an estimated seasonal high water elevation of 127.3 feet above mean sea level. The bottom of Basin Number 2 has been designed with a bottom elevation of 130.00 feet above mean sea level, providing the minimum State requirement of two (2) feet separation.

The forebay for Basins 1and 2 are sized to store 50% of the water quality storm event.

Grassed spillways have been designed to safely pass the 100-year storm event assuming the basin to be full at the beginning of the storm.

For maintenance procedures of the infiltration basin, forebay's, wet basins and spillways refer to the Stormwater Management Facilities Maintenance Manual designed for this development.

Quantity Summary

- In accordance with N.J.A.C. 7:8-5.4 (a) 3 iii, runoff quantity calculations are required to demonstrate that the post-construction peak runoff rates for the 2, 10 and 100 storm events are 50, 75 and 80 percent respectively, of the pre-construction peak runoff rates. The percentage only applies to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development is to be constructed.

Table 4.1: Basin 1 Pre-Development Flows Area "A"

Storm Event	Pre-Development Peak Flow	Allowable Peak Discharge
24 hr. 2 year storm	3.39cfs	1.70cfs*
24 hr. 10 year storm	11.36cfs	8.52cfs*
24hr. 100 year storm	34.58cfs	27.66 fs*

* 3.39cfs x 50% = 1.70cfs
* 11.36cfs x 75% = 8.52cfs
* 34.58cfs x 80% = 27.66cfs

Table 4.2: Basin 1 Pre-Development Flows Area "B"

Storm Event	Pre-Development Peak Flow	Allowable Peak Discharge
24 hr. 2 year storm	2.87cfs	1.44cfs*
24 hr. 10 year storm	12.37cfs	9.28cfs*
24hr. 100 year storm	42.47cfs	33.98cfs*

* 2.87cfs x 50% = 1.44cfs
* 12.37cfs x 75% = 9.28cfs
* 42.47cfs x 80% = 33.98cfs

It should be noted that that the peak runoff flows for Area "B" were developed assuming the property to be in its natural state prior to site becoming a borrow pit.

Table 4.3: Basin #1 Routed Runoff Post Development Runoff Flows and Volumes

Storm Event	Peak In	Peak Out	Peak Elevation	Peak Volume
24 hr. 2 Year Storm	18.56cfs	1.57cfs	134.22	74,769cf
24 hr. 10 Year Storm	32.94cfs	6.79cfs	135.44	110,115cf
24 hr. 100 Year Storm	66.64cfs	21.76cfs	138.05	198,363cf

Table 4.4: Basin #2 Routed Runoff Post Development Runoff Flows and Volumes

Storm Event	Peak In	Peak Out	Peak Elevation	Peak Volume
24 hr. 2 Year Storm	24.45cfs	0.77cfs	131.83	116,907cf
24 hr. 10 Year Storm	41.87cfs	8.18cfs	132.17	140,263cf
24 hr. 100 Year Storm	83.26cfs	56.83cfs	132.98	197,805cf

Table 4.5: Basin #3 Routed Runoff Post Development Runoff Flows and Volumes

Storm Event	Peak In	Peak Out	Peak Elevation	Peak Volume
24 hr. 2 Year Storm	9.71cfs	0.16cfs	130.12	66,368cf
24 hr. 10 Year Storm	16.52cfs	0.73cfs	130.74	180,586cf
24 hr. 100 Year Storm	78.82cfs	2.54cfs	132.04	424,336cf

As demonstrated runoff quantities has been controlled in accordance with N.J.A.C. 7:8-5.4 (a) 3 iii.

Basin Water Quality Summary

- In accordance with N.J.A.C. 7:8-5.5, the water quality regulations require the removal of 80% of the Total Suspended Solids (TSS) from the water quality storm (defined as 1.25 inches of rainfall over 2 hours), and the removal of nutrients to the maximum extent feasible or be designed to store a minimum three (3) times the water volume produced from the water quality storm event within the permanent pool volume. The TSS and nutrient removal can be accomplished with a variety of structural and non-structural Best Management Practices (BMPs) provided in the regulations.

Table 4.6: Basin 1 Water Quality Post Development Flows and Volumes Dirty Water from Parking, Driveways and Roads

Storm Event	Peak In	Peak Out	Peak Elevation	Peak Volume
B1 WQ Storm Event	6.22cfs	0cfs	131.70	14,324cf

As demonstrated within Table 4.5 water quality for Basin 1 has been controlled in accordance with N.J.A.C. 7:8-5.4 (a) 3 iii.

Table 4.7: Basin 2 Water Quality Post Development Flows and Volumes Dirty Water from Parking, Driveways and Roads

Storm Event	Peak In	Peak Out	Peak Elevation	Peak Volume
B2 WQ Storm Event	10.12cfs	0cfs	130.94	57,641cf

As demonstrated within Table 4.6 water quality for Basin 2 has been controlled in accordance with N.J.A.C. 7:8-5.4 (a) 3 iii.

Table 4.8: Basin 3 Permanent Pool Volumes

Elevation	Square Feet	Cubic Feet
121.5 Bottom	110,934	0
122	113,496	56,108
123	118,679	172,196
124	123,929	293,500
125	129,245	420,087
126	134,628	552,024
127	151,162	695,919
128 Normal Water	156,812	849,906

The total pool volume within Bain 3 is equal to 849,906 cubic feet of water. Three (3) times the water quality storm volume must be provided within the basin storage to meet water quality and since no dirty water from parking, driveways or roads enter Basin 3 water quality has been controlled in accordance with N.J.A.C. 7:8-5.4 (a) 3 iii.

5.0 GROUNDWATER RECHARGE

As required by N.J.A.C. 7:8-5.4(a) 1, demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual pre-construction groundwater recharge volume for the site.

As demonstrated by the Annual Groundwater Recharge Analysis (GSR-32) worksheet the Post Development Annual Recharge Deficit is equal to 446,429 cubic feet.

As designed the onsite Basins 2 will recharge the following cubic feet of water:

- Basin 2 will recharge 446,429 cubic feet of water @ 1.4" water depth.

Therefore the Groundwater Recharge requirement, in accordance with N.J.A.C. 7:8-5.4(a) 2, has been met.

6.0 SOIL EROSION AND SEDIMENT CONTROL

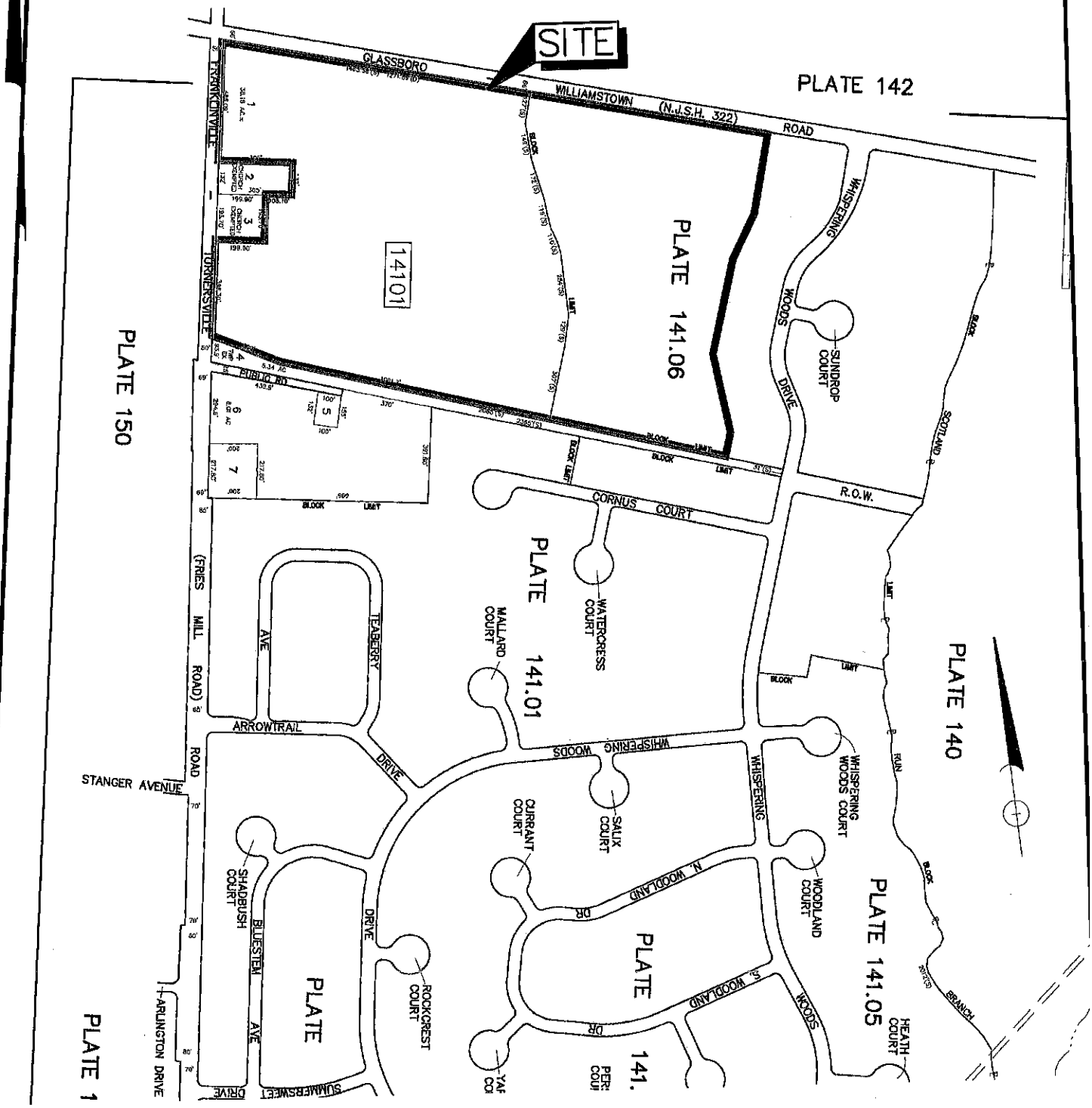
Temporary erosion and sediment control measures are outlined on the Erosion and Sediment Control Plans, drawing number CS1301, CS1302, CS1401 and CS1402 within the Preliminary Subdivision Plan Package. Erosion and sediment control measures shall be in accordance with the standards set forth by the Gloucester County Soil Conservation District.

Conduit outlet protection has been provided at each endwall structure to prevent erosion. Supporting calculations are in compliance with the Standards for Soil Erosion and Sediment Control in New Jersey Manuel and can be found in Appendix A.

7.0 CONCLUSION

As described above, the Stormwater Management and conveyance systems are designed in accordance with applicable state and local municipality regulations and requirements. The basins are designed to accommodate the required groundwater recharge and provide water quality and quantity measures as outlined in N.J.A.C. 7:8. The complete stormwater management and storm sewer system are also designed to accommodate specified storms and convey stormwater flow as required by Monroe Township.

FIGURE MAPS



REFERENCE: MONROE TOWNSHIP TAX MAP

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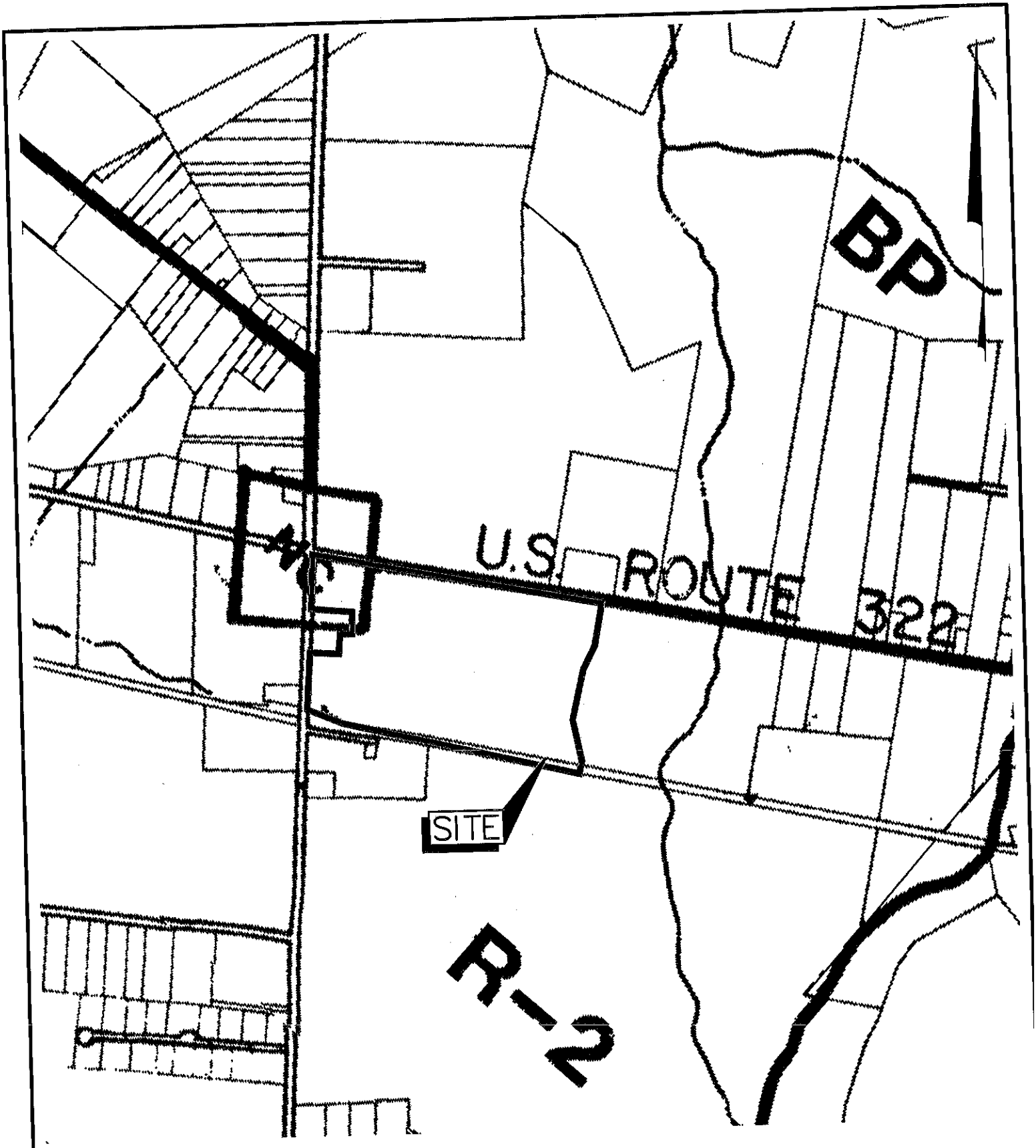
TAX MAP – FIG. 1

BLAZE MILL

MONROE TOWNSHIP, GLOUCESTER COUNTY, NJ

DATE:	SCALE:	DRAWN BY:
08/08/14	1"=600'	LD



REFERENCE: MONROE TOWNSHIP ZONING MAP

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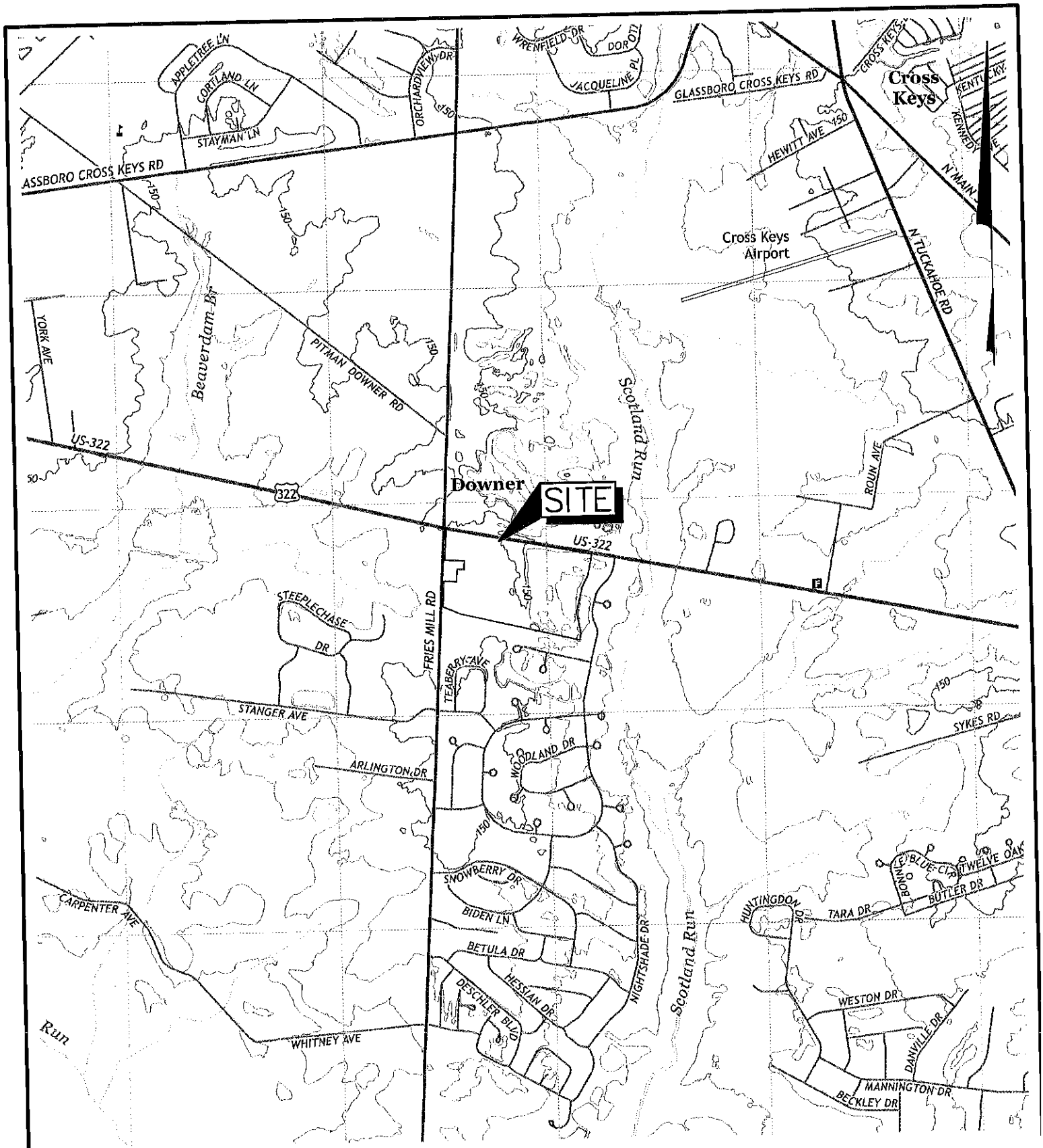
ZONING MAP – FIG. 2

BLAZE MILL

MONROE TOWNSHIP, GLOUCESTER COUNTY, NJ

DATE:	SCALE:	DRAWN BY:
08/08/14	1"=1,000'	LD



REFERENCE: PITMAN EAST U.S.G.S. QUADRANGLE

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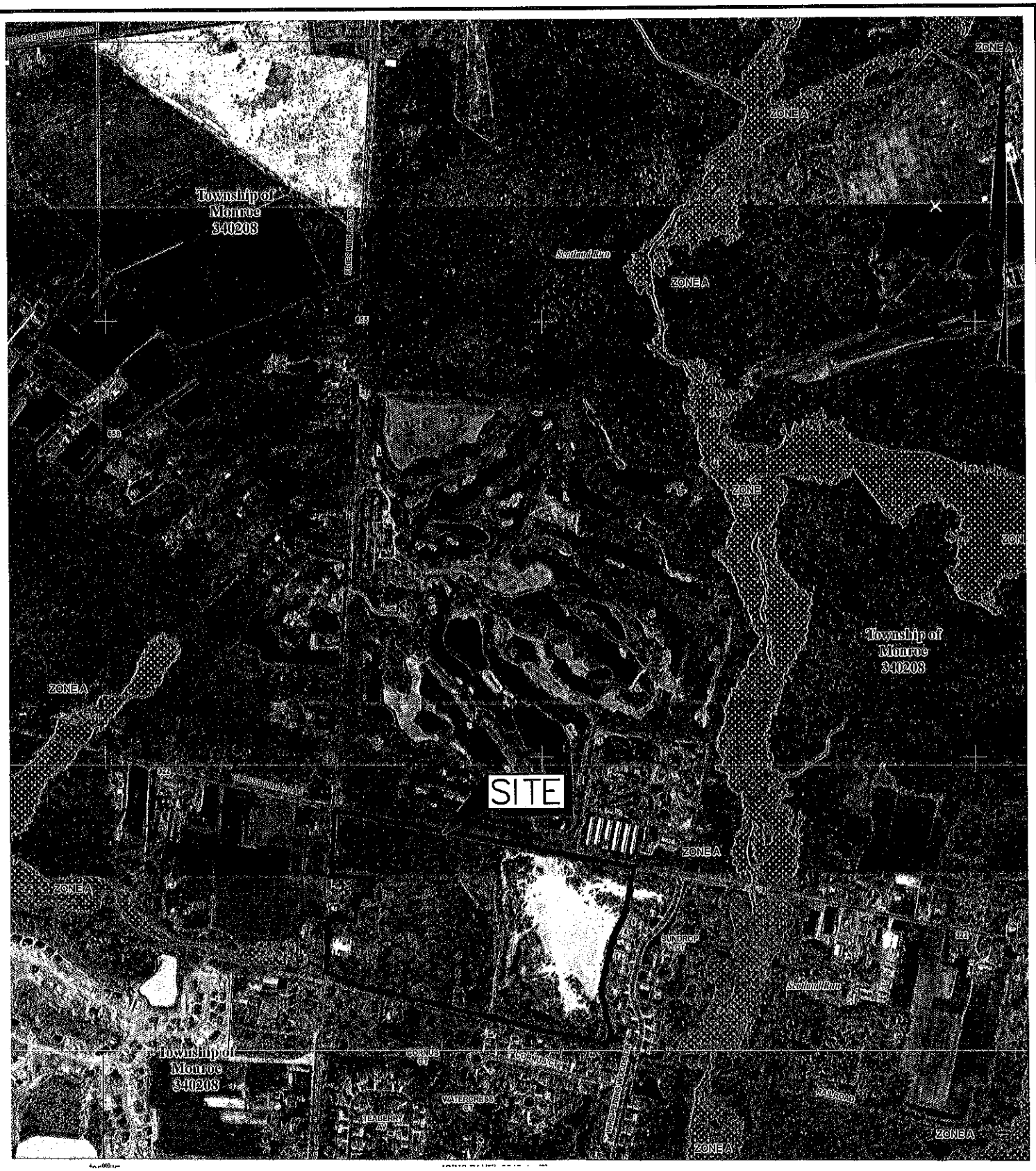
QUAD MAP – FIG. 3

BLAZE MILL

MONROE TOWNSHIP, GLOUCESTER COUNTY, NJ

DATE:	SCALE:	DRAWN BY:
08/08/14	1"=2,000'	LD



REFERENCE: USDA SOIL SURVEY

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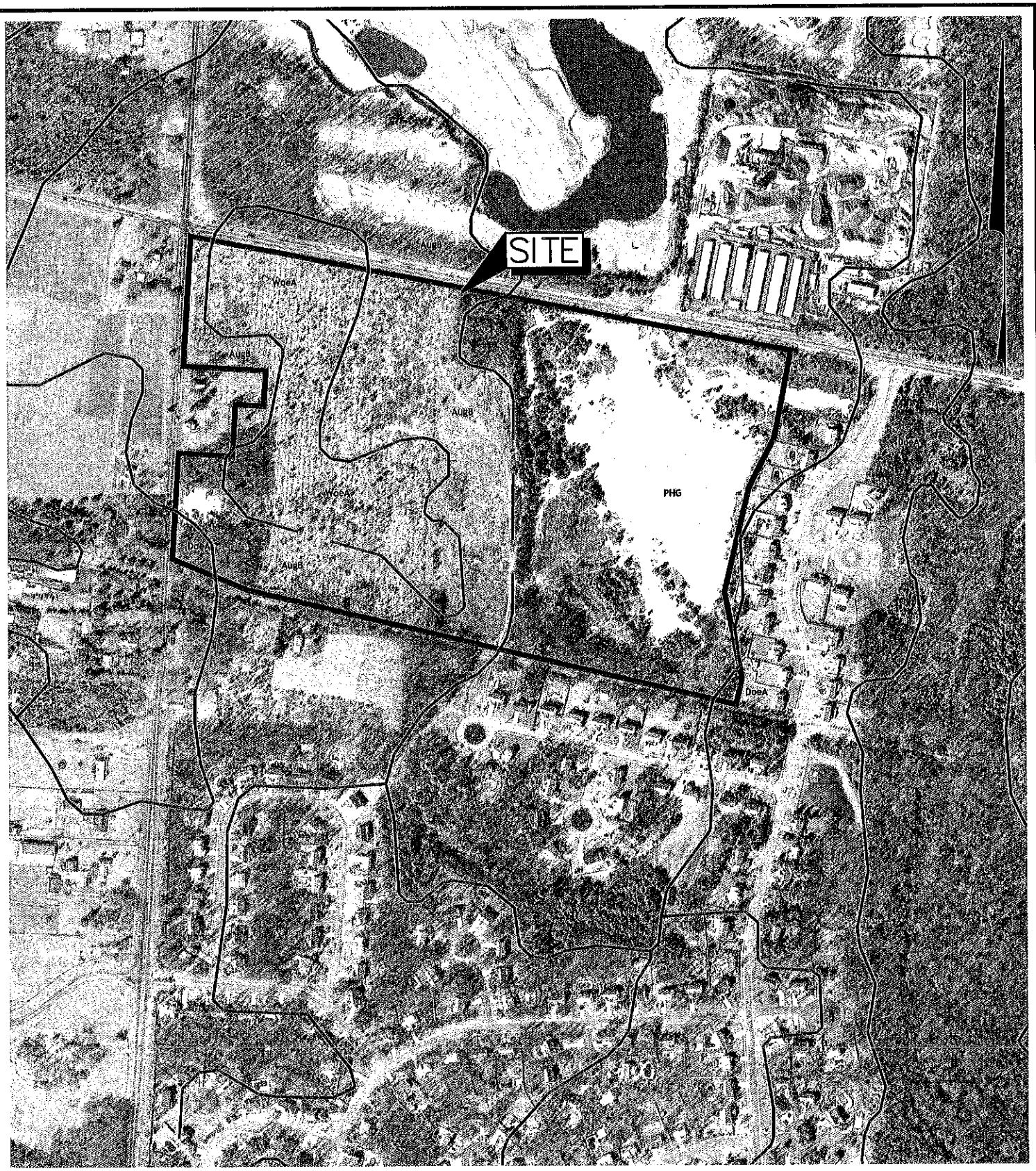
FLOOD MAP – FIG. 4

BLAZE MILL

MONROE TOWNSHIP, GLOUCESTER COUNTY, NJ

DATE:	SCALE:	DRAWN BY:
08/08/14	1"=1,000'	TJK



REFERENCE: SOILS LIMITS OBTAINED FROM NATIONAL RESOURCES CONSERVATION SERVICES (NRCS), U.S. DEPARTMENT OF AGRICULTURE

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SOILS MAP – FIG. 5

BLAZE MILL

MONROE TOWNSHIP, GLOUCESTER COUNTY, NJ

DATE:	SCALE:	DRAWN BY:
08/08/14	1"=500'	LD

SECTION "A"

STORM SEWER DESIGN CALCULATIONS

- INLET DRAINAGE AREA CALCULATIONS
- STORM SEWER CALCULATIONS
- STORM SEWER CONDUIT OUTLET PROTECTION CALCULATIONS

INLET DRAINAGE AREA CALCULATIONS

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-1				

Inlet I-1 is to be utilized for discharge from a future basin within the commercial part of the development.
Discharge will be limited to the 100 year pre development runoff rate associated with the commercial area.
The 100 year pre development rate is equal to 19.28 cfs.
The allowable discharge rate is equal to 19.28 cfs x 80% or 15.42 cfs

Area to I-2	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0200	3.28%
	Lawn Cover B Soil	0.25	0.3200	52.46%
	Lawn Cover C Soil	0.51	0.2700	44.26%
	TOTALS:	0.39	0.6100	100.00%
Area to I-3	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0500	15.63%
	Lawn Cover B Soil	0.25	0.0000	
	Lawn Cover C Soil	0.51	0.2700	84.38%
	TOTALS:	0.59	0.3200	100.00%
Area to I-4	Road Surfaces	0.99	0.0800	27.59%
	Driveway Surfaces	0.99	0.0300	10.34%
	Sidewalk Surfaces	0.99	0.0100	3.45%
	Building Surfaces	0.99	0.0400	13.79%
	Lawn Cover B Soil	0.25	0.0100	3.45%
	Lawn Cover C Soil	0.51	0.1200	41.38%
	TOTALS:	0.77	0.2900	100.00%
Area to I-5	Road Surfaces	0.99	0.0400	44.44%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	11.11%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0000	
	Lawn Cover C Soil	0.51	0.0400	44.44%
	TOTALS:	0.78	0.0900	100.00%
Area to I-6	Road Surfaces	0.99	0.1000	23.26%
	Driveway Surfaces	0.99	0.0600	13.95%
	Sidewalk Surfaces	0.99	0.0200	4.65%
	Building Surfaces	0.99	0.1200	27.91%
	Lawn Cover B Soil	0.25	0.0000	
	Lawn Cover C Soil	0.51	0.1300	30.23%
	TOTALS:	0.84	0.4300	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-7	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.1200	30.00%
	Lawn Cover B Soil	0.25	0.1400	35.00%
	Lawn Cover C Soil	0.51	0.1400	35.00%
	TOTALS:	0.56	0.4000	100.00%
Area to I-8	Road Surfaces	0.99	0.2300	33.82%
	Driveway Surfaces	0.99	0.0700	10.29%
	Sidewalk Surfaces	0.99	0.0300	4.41%
	Building Surfaces	0.99	0.1200	17.65%
	Lawn Cover B Soil	0.25	0.0100	1.47%
	Lawn Cover C Soil	0.51	0.2200	32.35%
	TOTALS:	0.82	0.6800	100.00%
Area to I-9	Road Surfaces	0.99	0.2100	36.84%
	Driveway Surfaces	0.99	0.0700	12.28%
	Sidewalk Surfaces	0.99	0.0200	3.51%
	Building Surfaces	0.99	0.1200	21.05%
	Lawn Cover B Soil	0.25	0.1000	17.54%
	Lawn Cover C Soil	0.51	0.0500	8.77%
	TOTALS:	0.82	0.5700	100.00%
Area to I-10	Road Surfaces	0.99	0.1400	24.56%
	Driveway Surfaces	0.99	0.1100	19.30%
	Sidewalk Surfaces	0.99	0.0300	5.26%
	Building Surfaces	0.99	0.1600	28.07%
	Lawn Cover B Soil	0.25	0.0200	3.51%
	Lawn Cover C Soil	0.51	0.1100	19.30%
	TOTALS:	0.87	0.5700	100.00%
Area to I-11	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0200	1.21%
	Lawn Cover B Soil	0.25	1.0800	65.45%
	Lawn Cover C Soil	0.51	0.5500	33.33%
	TOTALS:	0.35	1.6500	100.00%
Area to I-12	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.2400	28.24%
	Lawn Cover B Soil	0.25	0.0200	2.35%
	Lawn Cover C Soil	0.51	0.5900	69.41%
	TOTALS:	0.64	0.8500	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-13	Road Surfaces	0.99	0.0900	56.25%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0200	12.50%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0000	
	Lawn Cover C Soil	0.51	0.0500	31.25%
	TOTALS:	0.84	0.1600	100.00%
Area to I-14	Road Surfaces	0.99	0.1800	36.73%
	Driveway Surfaces	0.99	0.0500	10.20%
	Sidewalk Surfaces	0.99	0.0300	6.12%
	Building Surfaces	0.99	0.0700	14.29%
	Lawn Cover B Soil	0.25	0.1300	26.53%
	Lawn Cover C Soil	0.51	0.0300	6.12%
	TOTALS:	0.76	0.4900	100.00%
Area to I-15	Road Surfaces	0.99	0.1200	30.77%
	Driveway Surfaces	0.99	0.0600	15.38%
	Sidewalk Surfaces	0.99	0.0200	5.13%
	Building Surfaces	0.99	0.0700	17.95%
	Lawn Cover B Soil	0.25	0.0100	2.56%
	Lawn Cover C Soil	0.51	0.1100	28.21%
	TOTALS:	0.84	0.3900	100.00%
Area to I-16	Road Surfaces	0.99	0.1300	72.22%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0200	11.11%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0100	5.56%
	Lawn Cover C Soil	0.51	0.0200	11.11%
	TOTALS:	0.90	0.1800	100.00%
Area to I-17	Road Surfaces	0.99	0.2000	25.32%
	Driveway Surfaces	0.99	0.1300	16.46%
	Sidewalk Surfaces	0.99	0.0300	3.80%
	Building Surfaces	0.99	0.1900	24.05%
	Lawn Cover B Soil	0.25	0.2400	30.38%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.77	0.7900	100.00%
Area to I-18	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.1500	13.64%
	Lawn Cover B Soil	0.25	0.9500	86.36%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.35	1.1000	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-19	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0700	16.28%
	Lawn Cover B Soil	0.25	0.3600	83.72%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.37	0.4300	100.00%
Area to I-20	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0500	16.13%
	Lawn Cover B Soil	0.25	0.2600	83.87%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.37	0.3100	100.00%
Area to I-21	Road Surfaces	0.99	0.0800	25.81%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0300	9.68%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.2000	64.52%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.51	0.3100	100.00%
Area to I-22	Road Surfaces	0.99	0.2300	85.19%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0300	11.11%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0100	3.70%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.96	0.2700	100.00%
Area to I-23	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	3.23%
	Building Surfaces	0.99	0.0500	16.13%
	Lawn Cover B Soil	0.25	0.2500	80.65%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.39	0.3100	100.00%
Area to I-24	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0600	11.11%
	Lawn Cover B Soil	0.25	0.4000	74.07%
	Lawn Cover C Soil	0.51	0.0800	14.81%
	TOTALS:	0.37	0.5400	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover	
Area to I-25	Road Surfaces	0.99	0.0000		
	Driveway Surfaces	0.99	0.0000		
	Sidewalk Surfaces	0.99	0.0000		
	Building Surfaces	0.99	0.2500	25.51%	
	Lawn Cover B Soil	0.25	0.0000		
	Lawn Cover C Soil	0.51	0.7300	74.49%	
	TOTALS:	0.63	0.9800	100.00%	
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Area to I-26	Road Surfaces	0.99	0.0000		
	Driveway Surfaces	0.99	0.0000		
	Sidewalk Surfaces	0.99	0.0000		
	Building Surfaces	0.99	0.1400	18.18%	
	Lawn Cover B Soil	0.25	0.0000		
	Lawn Cover C Soil	0.51	0.6300	81.82%	
	TOTALS:	0.60	0.7700	100.00%	
Area to I-27	Road Surfaces	0.99	0.1200	23.08%	
	Driveway Surfaces	0.99	0.1100	21.15%	
	Sidewalk Surfaces	0.99	0.0200	3.85%	
	Building Surfaces	0.99	0.1500	28.85%	
	Lawn Cover B Soil	0.25	0.1000	19.23%	
	Lawn Cover C Soil	0.51	0.0200	3.85%	
	TOTALS:	0.83	0.5200	100.00%	
Area to I-28	Road Surfaces	0.99	0.1100	23.40%	
	Driveway Surfaces	0.99	0.0900	19.15%	
	Sidewalk Surfaces	0.99	0.0200	4.26%	
	Building Surfaces	0.99	0.1500	31.91%	
	Lawn Cover B Soil	0.25	0.1000	21.28%	
	Lawn Cover C Soil	0.51	0.0000		
	TOTALS:	0.83	0.4700	100.00%	
Area to I-29	Road Surfaces	0.99	0.0000		
	Driveway Surfaces	0.99	0.0000		
	Sidewalk Surfaces	0.99	0.0000		
	Building Surfaces	0.99	0.0800	15.09%	
	Lawn Cover B Soil	0.25	0.4500	84.91%	
	Lawn Cover C Soil	0.51	0.0000		
	TOTALS:	0.36	0.5300	100.00%	
Area to I-30	Road Surfaces	0.99	0.0000		
	Driveway Surfaces	0.99	0.0000		
	Sidewalk Surfaces	0.99	0.0000		
	Building Surfaces	0.99	0.0400	19.05%	
	Lawn Cover B Soil	0.25	0.1700	80.95%	
	Lawn Cover C Soil	0.51	0.0000		
	TOTALS:	0.39	0.2100	100.00%	

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-31	Road Surfaces	0.99	0.1200	22.64%
	Driveway Surfaces	0.99	0.1100	20.75%
	Sidewalk Surfaces	0.99	0.0200	3.77%
	Building Surfaces	0.99	0.1400	26.42%
	Lawn Cover B Soil	0.25	0.1200	22.64%
	Lawn Cover C Soil	0.51	0.0200	3.77%
	TOTALS:	0.80	0.5300	100.00%
Area to I-32	Road Surfaces	0.99	0.1200	27.27%
	Driveway Surfaces	0.99	0.0700	15.91%
	Sidewalk Surfaces	0.99	0.0200	4.55%
	Building Surfaces	0.99	0.0900	20.45%
	Lawn Cover B Soil	0.25	0.0000	
	Lawn Cover C Soil	0.51	0.1400	31.82%
	TOTALS:	0.84	0.4400	100.00%
Area to I-33	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0200	4.26%
	Building Surfaces	0.99	0.0500	10.64%
	Lawn Cover B Soil	0.25	0.4000	85.11%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.36	0.4700	100.00%
Area to I-34	Road Surfaces	0.99	0.1500	31.25%
	Driveway Surfaces	0.99	0.0300	6.25%
	Sidewalk Surfaces	0.99	0.0300	6.25%
	Building Surfaces	0.99	0.0500	10.42%
	Lawn Cover B Soil	0.25	0.2200	45.83%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.65	0.4800	100.00%
Area to I-35	Road Surfaces	0.99	0.1200	28.57%
	Driveway Surfaces	0.99	0.0700	16.67%
	Sidewalk Surfaces	0.99	0.0200	4.76%
	Building Surfaces	0.99	0.1100	26.19%
	Lawn Cover B Soil	0.25	0.1000	23.81%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.81	0.4200	100.00%
Area to I-36	Road Surfaces	0.99	0.1900	16.81%
	Driveway Surfaces	0.99	0.0400	3.54%
	Sidewalk Surfaces	0.99	0.0400	3.54%
	Building Surfaces	0.99	0.1600	14.16%
	Lawn Cover B Soil	0.25	0.7000	61.95%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.53	1.1300	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-37	Road Surfaces	0.99	0.1700	29.31%
	Driveway Surfaces	0.99	0.0400	6.90%
	Sidewalk Surfaces	0.99	0.0200	3.45%
	Building Surfaces	0.99	0.1000	17.24%
	Lawn Cover B Soil	0.25	0.2500	43.10%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.67	0.5800	100.00%
Area to I-38	Road Surfaces	0.99	0.1200	23.53%
	Driveway Surfaces	0.99	0.0700	13.73%
	Sidewalk Surfaces	0.99	0.0200	3.92%
	Building Surfaces	0.99	0.0800	15.69%
	Lawn Cover B Soil	0.25	0.2200	43.14%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.67	0.5100	100.00%
Area to I-39	Road Surfaces	0.99	0.1300	24.53%
	Driveway Surfaces	0.99	0.1100	20.75%
	Sidewalk Surfaces	0.99	0.0100	1.89%
	Building Surfaces	0.99	0.1500	28.30%
	Lawn Cover B Soil	0.25	0.1300	24.53%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.81	0.5300	100.00%
Area to I-40	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0800	30.77%
	Lawn Cover B Soil	0.25	0.1800	69.23%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.48	0.2600	100.00%
Area to I-41	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.1000	24.39%
	Lawn Cover B Soil	0.25	0.3100	75.61%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.43	0.4100	100.00%
Area to I-42	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0400	18.18%
	Lawn Cover B Soil	0.25	0.1800	81.82%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.38	0.2200	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-43	Road Surfaces	0.99	0.0400	66.67%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	16.67%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0100	16.67%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.87	0.0600	100.00%
Area to I-44	Road Surfaces	0.99	0.0800	66.67%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	8.33%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0300	25.00%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.81	0.1200	100.00%
Area to I-45	Road Surfaces	0.99	0.0800	28.57%
	Driveway Surfaces	0.99	0.0600	21.43%
	Sidewalk Surfaces	0.99	0.0100	3.57%
	Building Surfaces	0.99	0.0800	28.57%
	Lawn Cover B Soil	0.25	0.0500	17.86%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.86	0.2800	100.00%
Area to I-46	Road Surfaces	0.99	0.0700	25.93%
	Driveway Surfaces	0.99	0.0600	22.22%
	Sidewalk Surfaces	0.99	0.0100	3.70%
	Building Surfaces	0.99	0.0800	29.63%
	Lawn Cover B Soil	0.25	0.0500	18.52%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.85	0.2700	100.00%
Area to I-47	Road Surfaces	0.99	0.1100	30.56%
	Driveway Surfaces	0.99	0.0500	13.89%
	Sidewalk Surfaces	0.99	0.0200	5.56%
	Building Surfaces	0.99	0.0700	19.44%
	Lawn Cover B Soil	0.25	0.1100	30.56%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.76	0.3600	100.00%
Area to I-48	Road Surfaces	0.99	0.1200	66.67%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	5.56%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0500	27.78%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.78	0.1800	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-49	Road Surfaces	0.99	0.0100	50.00%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0100	50.00%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.62	0.0200	100.00%
Area to I-50	Road Surfaces	0.99	0.1700	25.76%
	Driveway Surfaces	0.99	0.1700	25.76%
	Sidewalk Surfaces	0.99	0.0300	4.55%
	Building Surfaces	0.99	0.1600	24.24%
	Lawn Cover B Soil	0.25	0.1300	19.70%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.84	0.6600	100.00%
Area to I-51	Road Surfaces	0.99	0.1000	31.25%
	Driveway Surfaces	0.99	0.0700	21.88%
	Sidewalk Surfaces	0.99	0.0200	6.25%
	Building Surfaces	0.99	0.0900	28.13%
	Lawn Cover B Soil	0.25	0.0400	12.50%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.90	0.3200	100.00%
Area to I-52	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.1700	16.19%
	Lawn Cover B Soil	0.25	0.8600	81.90%
	Lawn Cover C Soil	0.51	0.0200	1.90%
	TOTALS:	0.37	1.0500	100.00%
Area to I-53	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0800	17.39%
	Lawn Cover B Soil	0.25	0.3800	82.61%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.38	0.4600	100.00%
Area to I-54	Road Surfaces	0.99	0.1000	83.33%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	8.33%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0100	8.33%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.93	0.1200	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-55	Road Surfaces	0.99	0.1000	27.03%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	2.70%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.2600	70.27%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.47	0.3700	100.00%
Area to I-56	Road Surfaces	0.99	0.0600	42.86%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	7.14%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0700	50.00%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.62	0.1400	100.00%
Area to I-57	Road Surfaces	0.99	0.0300	100.00%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0000	
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.99	0.0300	100.00%
Area to I-58	Road Surfaces	0.99	0.1700	21.25%
	Driveway Surfaces	0.99	0.1200	15.00%
	Sidewalk Surfaces	0.99	0.0300	3.75%
	Building Surfaces	0.99	0.1900	23.75%
	Lawn Cover B Soil	0.25	0.2900	36.25%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.72	0.8000	100.00%
Area to I-59	Road Surfaces	0.99	0.1500	21.13%
	Driveway Surfaces	0.99	0.1300	18.31%
	Sidewalk Surfaces	0.99	0.0300	4.23%
	Building Surfaces	0.99	0.2200	30.99%
	Lawn Cover B Soil	0.25	0.1800	25.35%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.80	0.7100	100.00%
Area to I-60	Road Surfaces	0.99	0.0300	75.00%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0100	25.00%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.81	0.0400	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-61	Road Surfaces	0.99	0.0500	41.67%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	8.33%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0600	50.00%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.62	0.1200	100.00%
Area to I-62	Road Surfaces	0.99	0.1600	26.67%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0200	3.33%
	Building Surfaces	0.99	0.0800	13.33%
	Lawn Cover B Soil	0.25	0.3400	56.67%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.57	0.6000	100.00%
Area to I-63	Road Surfaces	0.99	0.0700	22.58%
	Driveway Surfaces	0.99	0.0500	16.13%
	Sidewalk Surfaces	0.99	0.0100	3.23%
	Building Surfaces	0.99	0.0800	25.81%
	Lawn Cover B Soil	0.25	0.1000	32.26%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.75	0.3100	100.00%
Area to I-64	Road Surfaces	0.99	0.0500	41.67%
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0100	8.33%
	Building Surfaces	0.99	0.0000	
	Lawn Cover B Soil	0.25	0.0600	50.00%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.62	0.1200	100.00%
Area to I-65	Road Surfaces	0.99	0.1200	21.82%
	Driveway Surfaces	0.99	0.0800	14.55%
	Sidewalk Surfaces	0.99	0.0200	3.64%
	Building Surfaces	0.99	0.1400	25.45%
	Lawn Cover B Soil	0.25	0.1900	34.55%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.73	0.5500	100.00%
Area to I-66	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.1100	10.09%
	Lawn Cover B Soil	0.25	0.9800	89.91%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.32	1.0900	100.00%

RUNOFF CURVE NUMBERS

Project:	Blaze Mill #2958	By	GMM
Location:	Monroe Township	Date	07/31/14
Condition:	Post Development	Revised	3/27/2015

Sub-Area Number	Cover Description	C	Area	%Cover
Area to I-67	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0600	11.54%
	Lawn Cover B Soil	0.25	0.4600	88.46%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.34	0.5200	100.00%
Area to I-68	Road Surfaces	0.99	0.0000	
	Driveway Surfaces	0.99	0.0000	
	Sidewalk Surfaces	0.99	0.0000	
	Building Surfaces	0.99	0.0800	15.69%
	Lawn Cover B Soil	0.25	0.4300	84.31%
	Lawn Cover C Soil	0.51	0.0000	
	TOTALS:	0.37	0.5100	100.00%

STORM SEWER CALCULATIONS

JAMES SASSANO ASSOCIATES, INC.

STORM SEWER COMPUTATION SHEET

Municipality: Monroe Township
Project Name: Blaze Mill Townhouse Development #2958
Computed By: GMM Date: 7/31/14 Checked By:
Revised By: GMM Date: 3/27/15 "n" Factor: 0.013 RCP
Revised By: GMM Date: 11/2/15

Sheet 1 of 3
Pipe Material: RCP
25 Year Storm

Location	From	To	Inc. Area Ac	C	Equiv. Area C * A	Total Area C * A	Tc min	I in/hr	Q CFS	Slope ft/ft	Pipe Dia. in	V FPS	Pipe Length ft	Flow Time min.	Pipe Cap. CFS	Ground Elev. Upper End	Ground Elev. Lower End	Invert Elev. Upper End	Invert Elev. Lower End	CHECKS Pipe Cap.	CHECKS Inlet Flow (cfs)
									10.31												
	I-2	I-3	0.61	0.39	0.24	0.24	10.0	6.20	1.47	0.0040	15	3.33	67	0.34	4.09	145.00	145.00	142.46	142.19	ok	1.47
	I-3	I-4	0.32	0.59	0.19	0.42	10.3	6.10	12.90	0.0055	24	5.34	126	0.39	16.78	145.00	145.35	141.44	140.75	ok	1.14
	I-4	I-5	0.29	0.77	0.22	0.65	10.7	6.00	14.19	0.0061	24	5.62	93	0.28	17.67	145.35	144.88	140.75	140.18	ok	1.33
	I-5	I-6	0.09	0.78	0.07	0.72	11.0	6.00	14.61	0.0063	24	5.72	30	0.09	17.96	144.88	144.88	140.18	139.99	ok	0.42
	I-6	MH-1	0.43	0.84	0.36	1.08	11.1	6.00	16.79	0.0072	24	6.11	57	0.16	19.20	144.88	144.76	139.99	139.58	ok	2.18
	I-7	I-8	0.40	0.56	0.23	0.23	10.0	6.20	1.40	0.0025	18	2.97	20	0.11	5.25	145.00	144.96	140.49	140.44	ok	1.40
	I-8	I-9	0.68	0.82	0.56	0.79	10.1	6.20	4.87	0.0024	18	2.91	103	0.59	5.15	144.96	144.52	140.44	140.19	ok	3.47
	I-9	I-10	0.57	0.82	0.47	1.25	10.7	6.00	7.51	0.0020	24	3.22	30	0.16	10.12	144.52	144.52	139.69	139.63	ok	2.80
	I-10	MH-1	0.57	0.87	0.50	1.75	10.9	6.00	10.49	0.0022	24	3.38	27	0.13	10.61	144.52	144.76	139.63	139.58	ok	2.98
	MH-1	I-13	0.00	0.00	0.00	2.83	11.2	6.00	27.28	0.0110	30	8.76	128	0.24	43.02	144.76	143.73	139.08	137.67	ok	
	Existing	I-11							5.09	0.0025	18	2.97	235	1.32	5.25	Existing	142.50	139.94	139.35	ok	5.09
	I-11	I-12	1.65	0.35	0.57	0.57	10.0	6.20	8.63	0.0018	24	3.06	205	1.12	9.60	142.50	142.55	138.85	138.48	ok	3.54
	I-12	I-13	0.85	0.64	0.54	1.11	11.1	6.00	11.77	0.0021	30	3.83	150	0.65	18.80	142.55	143.90	137.98	137.67	ok	3.26
	I-13	I-16	0.16	0.84	0.13	4.08	11.5	5.95	39.66	0.0020	53x34	4.68	145	0.52	44.99	143.90	143.00	137.34	137.05	ok	0.80
	I-14	I-15	0.49	0.76	0.37	0.37	10.0	6.20	2.32	0.0050	15	3.72	38	0.17	4.57	143.38	143.00	140.70	140.51	ok	2.32
	I-15	I-16	0.39	0.84	0.33	0.70	10.2	6.20	4.34	0.0050	15	3.72	30	0.13	4.57	143.00	143.00	140.51	140.36	ok	2.02
	I-16	I-17	0.18	0.90	0.16	4.94	12.0	5.85	44.29	0.0020	53x34	4.68	57	0.20	44.99	143.00	143.11	137.05	136.94	ok	0.94
	I-17	I-19	0.79	0.77	0.60	5.54	12.2	5.80	47.55	0.0024	53x34	5.12	130	0.42	49.29	143.11	142.00	136.94	136.63	ok	3.51
	I-18	I-19	1.10	0.35	0.39	0.39	10.0	6.20	2.39	0.0030	15	2.88	150	0.87	3.54	142.00	142.00	139.50	139.05	ok	2.39
	I-19	I-20	0.43	0.37	0.16	6.09	12.6	5.60	49.49	0.0025	53x34	5.23	150	0.48	50.30	142.00	142.00	136.63	136.26	ok	0.89
	I-20	I-29	0.31	0.37	0.11	6.20	13.1	5.50	49.51	0.0025	53x34	5.23	160	0.51	50.30	142.00	141.00	136.26	135.86	ok	0.63

JAMES SASSANO ASSOCIATES, INC.

STORM SEWER COMPUTATION SHEET

Municipality: Monroe Township
Project Name: Blaze Mill Townhouse Development #2958
Computed By: GMM Date: 7/31/14 Checked By:
Revised By: GMM Date: 3/27/15 "n" Factor: 0.013
Revised By: GMM Date: 11/2/15

Sheet 2 of 3
Pipe Material: RCP
25 Year Storm

Location	From	To	Inc. Area Ac	C	Equiv. Area Ac	Total Area Ac	Tc min	I in/hr	Q CFS	Slope ft/ft	Pipe Dia. in	V FPS	Pipe Length ft	Flow Time min.	Pipe Cap. CFS	Ground Elev. Upper End	Ground Elev. Lower End	Invert Elev. Upper End	Invert Elev. Lower End	CHECKS Pipe Cap.	CHECKS Inlet Flow (cfs)
	I-21	I-22	0.31	0.51	0.16	0.16	10.0	6.20	0.99	0.0033	15	3.02	30	0.17	3.71	144.87	144.87	142.00	141.90	ok	0.99
	I-22	I-23	0.27	0.96	0.26	0.42	10.2	6.00	2.51	0.0371	15	10.14	126	0.21	12.44	144.87	140.00	141.90	137.23	ok	1.56
	I-23	I-24	0.31	0.39	0.12	0.54	10.4	6.00	3.24	0.0026	18	3.03	115	0.63	5.36	140.00	140.00	136.98	136.68	ok	0.73
	I-24	I-26	0.54	0.37	0.20	0.74	11.0	6.00	4.45	0.0026	18	3.03	180	0.99	5.36	140.00	140.00	136.68	136.22	ok	1.20
	I-25	I-26	0.98	0.63	0.62	0.62	10.0	6.20	3.84	0.0026	18	3.03	165	0.91	5.36	140.20	140.00	137.45	137.02	ok	3.84
	I-26	I-27	0.77	0.60	0.46	1.82	10.9	6.00	10.92	0.0015	38 x 24	3.24	138	0.71	15.89	140.00	141.27	135.72	135.51	ok	2.76
	I-27	I-28	0.52	0.83	0.43	2.25	11.6	5.95	13.40	0.0015	38 x 24	3.24	63	0.32	15.89	141.27	141.56	135.51	135.42	ok	2.57
	I-28	I-29	0.47	0.83	0.39	2.64	11.9	5.85	15.46	0.0015	38 x 24	3.24	130	0.67	15.89	141.56	141.00	135.42	135.22	ok	2.29
	I-29	I-30	0.53	0.36	0.19	9.04	13.6	5.50	65.11	0.0043	42	6.86	165	0.40	65.97	141.00	141.00	135.05	134.34	ok	1.05
	I-30	EW-1	0.21	0.39	0.08	9.12	14.0	5.45	65.10	0.0043	42	6.86	85	0.21	65.97	141.00	———	134.34	133.98	ok	0.45
	I-31	I-32	0.53	0.80	0.43	0.43	10.0	6.20	2.64	0.0033	15	3.02	30	0.17	3.71	139.87	139.87	137.34	137.24	ok	2.64
	I-32	I-35	0.44	0.84	0.37	0.79	10.2	6.20	4.93	0.0110	15	5.52	284	0.86	6.78	139.87	136.74	137.24	134.11	ok	2.28
	I-33	I-34	0.47	0.36	0.17	0.17	10.0	6.20	1.05	0.0035	15	3.11	82	0.44	3.82	137.00	136.74	134.50	134.21	ok	1.05
	I-34	I-35	0.48	0.65	0.31	0.48	10.4	6.00	2.89	0.0033	15	3.02	30	0.17	3.71	136.74	136.74	134.21	134.11	ok	1.87
	I-35	I-39	0.42	0.81	0.34	1.62	11.0	6.00	9.71	0.0111	18	6.26	185	0.49	11.07	136.74	135.46	133.86	131.81	ok	2.05
	I-36	I-37	1.13	0.53	0.60	0.60	10.0	6.20	3.72	0.0027	18	3.09	30	0.16	5.46	135.26	135.26	132.20	132.12	ok	3.72
	I-37	I-38	0.58	0.67	0.39	0.99	10.2	6.20	6.14	0.0034	18	3.47	38	0.18	6.14	135.26	135.46	132.12	131.99	ok	2.41
	I-38	I-39	0.51	0.67	0.34	1.33	10.3	6.00	7.99	0.0060	18	4.60	30	0.11	8.14	135.46	135.46	131.99	131.81	ok	2.05
	I-39	I-43	0.53	0.81	0.43	3.38	11.5	5.90	19.93	0.0022	38 x 24	3.90	172	0.74	19.95	135.46	136.33	131.31	130.93	ok	2.53
	I-40	I-41	0.26	0.48	0.12	0.12	10.0	6.20	0.77	0.0035	15	3.11	130	0.70	3.82	137.00	137.00	134.50	134.05	ok	0.77
	I-41	I-42	0.41	0.43	0.18	0.30	10.7	6.00	1.80	0.0035	15	3.11	134	0.72	3.82	137.00	137.00	134.05	133.58	ok	1.06
	I-42	I-43	0.22	0.38	0.08	0.39	11.4	5.90	2.27	0.0035	15	3.11	127	0.68	3.82	137.00	136.33	133.58	133.13	ok	0.50
	I-43	I-44	0.06	0.87	0.05	3.82	12.3	5.85	22.32	0.0029	38 x 24	4.73	120	0.42	22.80	136.33	136.23	130.93	130.58	ok	0.30
	I-44	I-46	0.12	0.81	0.10	3.91	12.7	5.80	22.69	0.0029	38 x 24	4.50	186	0.69	22.80	136.23	135.28	130.58	130.04	ok	0.56
	I-45	I-46	0.28	0.86	0.24	0.24	10.0	6.20	1.49	0.0033	15	3.02	30	0.17	3.71	135.28	135.28	132.75	132.65	ok	1.49
	I-46	EW-2	0.27	0.85	0.23	4.38	13.4	5.75	25.20	0.0033	38 x 24	3.02	12	0.07	26.00	135.28	———	130.04	130.00	ok	1.32

JAMES SASSANO ASSOCIATES, INC.

STORM SEWER COMPUTATION SHEET

Municipality: Monroe Township
Project Name: Blaze Mill Townhouse Development #2958
Computed By: GMM Date: 7/31/14 Checked By:
Revised By: GMM Date: 3/27/15 "n" Factor: 0.013

Sheet 3 of 3
Pipe Material: RCP
25 Year Storm

Location	From	To	Inc. Area Ac	C	Equiv. Area Ac	Total Area Ac	Tc min	I in/hr	Q CFS	Slope ft/ft	Pipe Dia. in	V FPS	Pipe Length ft	Flow Time min.	Pipe Cap. CFS	Ground Elev. Upper End	Ground Elev. Lower End	Invert Elev. Upper End	Invert Elev. Lower End	CHECKS Pipe Cap.	CHECKS Inlet Flow (cfs)
	I-47	I-48	0.36	0.76	0.28	0.28	10.0	6.20	1.71	0.0033	15	3.02	30	0.17	3.71	136.49	136.49	134.00	133.90	ok	1.71
	I-48	I-49	0.18	0.78	0.14	0.42	10.2	6.20	2.58	0.0037	15	3.20	38	0.20	3.93	136.49	136.51	133.90	133.76	ok	0.88
	I-49	I-51	0.02	0.62	0.01	0.43	10.4	6.10	2.61	0.0041	15	3.37	268	1.33	4.14	136.51	135.10	133.76	132.66	ok	0.08
	I-50	I-51	0.66	0.84	0.56	0.56	10.0	6.20	3.45	0.0033	15	3.02	30	0.17	3.71	135.10	135.10	132.76	132.66	ok	3.45
	I-51	EW-3	0.32	0.90	0.29	1.27	11.7	5.90	7.51	0.0140	15	6.23	15	0.04	7.64	135.10	---------	130.21	130.00	ok	1.69
	I-52	I-53	1.05	0.37	0.39	0.39	10.0	6.20	2.44	0.0090	15	4.99	165	0.55	6.13	141.50	140.00	139.00	137.52	ok	2.44
	I-53	I-57	0.46	0.38	0.17	0.57	10.6	6.10	3.46	0.0041	15	3.37	111	0.55	4.14	140.00	140.30	137.52	137.07	ok	1.06
	I-54	I-55	0.12	0.93	0.11	0.11	10.0	6.20	0.69	0.0033	15	3.02	30	0.17	3.71	140.00	140.00	137.10	137.00	ok	0.69
	I-55	I-56	0.37	0.47	0.17	0.29	10.2	6.20	1.77	0.0037	15	3.20	38	0.20	3.93	140.00	140.30	137.00	136.86	ok	1.08
	I-56	I-57	0.14	0.62	0.09	0.37	10.4	6.10	2.27	0.0033	15	3.02	30	0.17	3.71	140.30	140.30	136.86	136.76	ok	0.53
	I-57	I-58	0.03	0.99	0.03	0.97	10.5	6.10	5.91	0.0100	15	5.26	38	0.12	6.46	140.30	139.00	136.76	136.38	ok	0.18
	I-58	I-59	0.80	0.72	0.58	1.55	10.6	6.10	9.44	0.0090	18	5.64	30	0.09	9.97	139.00	139.00	136.13	135.86	ok	3.52
	I-59	I-60	0.71	0.80	0.57	2.12	10.7	6.00	12.70	0.0150	18	7.28	38	0.09	12.87	139.00	138.57	135.86	135.29	ok	3.42
	I-60	I-61	0.04	0.81	0.03	2.26	10.8	6.00	13.56	0.0100	24	7.20	127	0.29	22.62	138.57	136.66	134.79	133.52	ok	0.19
	I-61	I-62	0.12	0.62	0.07	2.33	11.1	5.90	13.77	0.0210	24	10.44	38	0.06	32.78	136.66	135.96	133.52	132.72	ok	0.44
	I-62	I-63	0.60	0.57	0.34	2.68	11.2	5.90	15.79	0.0050	24	5.09	30	0.10	16.00	135.96	135.96	132.72	132.57	ok	2.02
	I-63	I-64	0.31	0.75	0.23	2.91	11.3	5.90	17.17	0.0058	24	5.48	38	0.12	17.23	135.96	136.09	132.57	132.35	ok	1.37
	I-64	I-65	0.12	0.62	0.07	2.98	11.4	5.90	17.61	0.0061	24	5.62	34	0.10	17.67	136.09	136.03	132.35	132.14	ok	0.44
	I-65	I-66	0.55	0.73	0.40	3.39	11.5	5.90	19.99	0.0025	30	4.18	155	0.62	20.51	136.03	135.40	131.64	131.26	ok	2.38
	I-66	I-67	1.09	0.32	0.35	3.74	12.1	5.85	21.89	0.0030	30	4.58	130	0.47	22.47	135.40	135.40	131.26	130.87	ok	2.07
	I-67	I-68	0.52	0.34	0.17	3.92	12.6	5.80	22.72	0.0033	30	4.80	130	0.45	23.56	135.40	135.40	130.87	130.44	ok	1.01
	I-68	EW-4	0.51	0.37	0.19	4.10	13.0	5.70	23.39	0.0015	45x29	3.65	130	0.59	25.83	135.40	---------	130.44	130.25	ok	1.06
	I-65	I-66	1.09	0.32	0.35	0.35	0.0	5.90	0.00	0.0012	30	2.89	155	0.89	14.21	136.03	135.40	135.00	134.81	ok	2.09

STORM SEWER CONDUIT OUTLET PROTECTION

CALCULATIONS

Project Name	Blaze Mill Townhouse Development	Date	7/31/14
Project Number	Project #2958	Rev	3/27/15

Conduit outlet protection computations

Structure No.	**EW-2**		
25 Yr. Discharge (Q25)	25.20 cfs	q=unit discharge=Q25/Wo =	7.95
Do =	2 feet	EW-2 Inv. : 130.00	
Wo =	3.17 feet	2Yr. Basin elevation = 131.83	
Tailwater (TW) =	1.83 feet		
Apron Length (La) =	((q x 3) / Do^0.5)		
La =	16.86 feet		
Apron Width (W) =	3 x Wo + 0.4(La)		
W =	16.26 feet		
Median Stone Dia.(D50) =	(0.016/TW)x(q)^1.33		
(D50)	0.14 feet	Use 6" min.	

Structure No.	**EW-3**		
25 Yr. Discharge (Q25)	7.51 cfs	q=unit discharge=Q25/Wo =	6.01
Do =	1.25 feet	EW-3 Inv. : 130.00	
Wo =	1.25 feet	2Yr. Basin elevation = 131.83	
Tailwater (TW) =	1.83 feet		
Apron Length (La) =	((q x 3) / Do^0.5)		
La =	16.12 feet		
Apron Width (W) =	3 x Wo + 0.4(La)		
W =	10.20 feet		
Median Stone Dia.(D50) =	(0.016/TW)x(q)^1.33		
(D50)	0.09 feet	Use 6" min.	

Structure No.	**EW-4**		
25 Yr. Discharge (Q25)	23.39 cfs	q=unit discharge=Q25/Wo =	6.24
Do =	2.42 feet	EW-4 Inv. : 130.00	
Wo =	3.75 feet	2Yr. Basin elevation = 131.83	
Tailwater (TW) =	1.83 feet		
Apron Length (La) =	((q x 3) / Do^0.5)		
La =	12.03 feet		
Apron Width (W) =	3 x Wo + 0.4(La)		
W =	16.06 feet		
Median Stone Dia.(D50) =	(0.016/TW)x(q)^1.33		
(D50)	0.10 feet	Use 6" min.	

Structure No.	**EW-5**		
25 Yr. Discharge (Q25)	19.52 cfs	q=unit discharge=Q25/Wo =	6.16
Do =	2 feet	EW-5 Inv. : 121.50	
Wo =	3.17 feet	2Yr. Basin elevation = 131.19	
Tailwater (TW) =	9.69 feet		
Apron Length (La) =	((q x 3) / Do^0.5)		
La =	13.06 feet		
Apron Width (W) =	3 x Wo + 0.4(La)		
W =	14.74 feet		
Median Stone Dia.(D50) =	(0.016/TW)x(q)^1.33		
(D50)	0.02 feet	Use 6" min.	

SCOUR HOLE AT EW-1

d50=0.0125/Tw (q1.33)
Y=1/2 Do
q=Q/Wo

Tw=2.37 feet El 25 yr. storm = 36.35-33.98 inv.=2.37
Do=3.5 feet
Q=65.10cfs
Wo=3.5 feet

q=Q/Wo
q=65.10/3.5
q=18.60

Y=1/2Do
Y=0.5 x 3.5
Y=1.75 feet

d50=0.0125/2.37 (18.60 1.33)
d50=0.00527 (49.28)
d50=0.26 feet of 3" minimum (use 6")

SECTION "B"

DEVELOPMENT CHECKLIST

- LOW IMPACT DEVELOPMENT CHECKLIST
- NJDEP NON STRUCTURAL STRATEGIES POINTS SYSTEM CALCULATION

LOW IMPACT DEVELOPMENT CHECKLIST

APPENDIX A

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

Municipality: Monroe Township

County: Gloucester County Date: July 31, 2014 Revised March 27, 2015

Review board or agency: Monroe Township and the Gloucester County Soil Conservation District

Proposed land development name: Blaze Mill

Lot(s): Lot 1 Lot 1.01 Block(s): Block14101 Block 1141.0602

Project or application number: _____

Applicant's name: Blaze Mill Development Group, LLC

Applicant's address: 1111 Marlkress Road, Suite 200

Cherry Hill, New Jersey 08003

Telephone: 856-424-7000 Fax: 856-424-7490

Email address: _____

Designer's name: Richard J. Clemson, P.E.

Designer's address: James Sassano Associates, Inc.

41 South Route 73, Building 1, Hammonton, New Jersey 08037

Telephone: 609-704-1155 Fax: 609-704-1166

Email address: rick@jsaengineering.com

Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

Non-structural stormwater management strategies for Berkley Square consist of the following:

1. Asphalt roadway paving cover is minimal to promote vehicular safety requirements.

2. Perimeter vegetation to remain where possible.

3. Grading disturbance limited to immediate construction area only.

4. All connected impervious cover runoff is directed to swales and storm sewer and to on-site basins.

5. Low maintenance and native vegetation is proposed.

6. Fertilizing to be in accordance with specifications set forth by Gloucester Co. Soil Conservation District.

7. Soil compaction is proposed for roadway paving and building areas only.

8. Grading designed to promote sheet and swale flow.

9. Time of concentrations increases after development to be attenuated by basins.

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:
N.J.A.C. 7:8, Monroe Township Land Code Book, Article XIII, Chapter 175-140, and the New Jersey Residential Site Improvement Standards.

Do regulations include nonstructural requirements? Yes: X No: _____

If yes, briefly describe: Reference is made that N.J.A.C 7:8 shall be followed for stormwater management design.

List LID-BMPs prohibited by local regulations: _____

Pre-design meeting held? Yes: _____ Date: _____ No: X

Meeting held with: _____

Pre-design site walk held? Yes: _____ Date: _____ No: X

Site walk held with: _____

Other agencies with stormwater review jurisdiction:

Name: Gloucester County Soil Conservation District

Required approval: SCD Certification

Name: Gloucester County Planning Board

Required approval: Subdivision Plan Approval

Name: Monroe Township Planning Board

Required approval: Subdivision Plan Approval

Part 3: Nonstructural Strategies and LID-BMPs in Design

3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed? Yes: X No: _____

If yes, was this inventory a factor in the site's layout and design? Yes: _____ No: X

A portion of the site is an existing soil borrow pit. A project is designed as per ordinance guidelines. Calculated areas for B below assumes 61.54 acres to the proposed street right of way lines minus the 13.12 acres for the future commercial site or 48.42 acres.

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: X No: _____ If yes, specify % of site: 3.5% *1

Native ground cover? Yes: X No: _____ If yes, specify % of site: 3.3% *2

Vegetated buffers? Yes: X No: _____ If yes, specify % of site: 3.3% *3

*1. 1.7 acres wetlands & buffer (1.7 / 48.42 = 3.5%) *2. 1.6 acres native cover (1.6 / 48.42 = 3.3%)

*3 1.6 acres (1.6 / 48.42 = 3.3%)

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: X No: _____ If yes, specify % of site: Not specified

Native ground cover? Yes: X No: _____ If yes, specify % of site: Not specified

Vegetated buffers? Yes: X No: _____ If yes, specify % of site: Not specified

D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: X No: _____

Reduce runoff pollutant loads through runoff treatment: Yes: X No: _____

Maintain groundwater recharge by preserving natural areas: Yes: X No: _____

3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

A. Have inventories of existing site soils and slopes been performed? Yes: X No: _____

If yes, were these inventories factors in the site's layout and design? Yes: _____ No: X

Soil designations were not a factor in the site layout, all soils are classified "B" & "C" soils and site is designed within ordinance guidelines.

B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners? Yes: X No: _____

If yes, how: Wetlands buffers and setbacks will be maintained and perimeter buffers will be proposed in accordance with Monroe Township Ordinances.

Restrict temporary site disturbance during construction? Yes: X No: _____

If yes, how: Temporary site disturbance is addressed by the erosion and sediment control plans.

Consider soils and slopes in selecting disturbance limits? Yes: X No: _____

If yes, how: Disturbance limits were defined by the wetlands soils and the buffers required.

C. Specify percentage of site to be cleared: 57.2% *1 Regraded: 89.8% *2

*1. 27.7 acres cleared (27.7 / 48.42 = 57.2%) *2. 43.5 acres regraded (43.5 / 48.42 = 89.8%)

D. Specify percentage of cleared areas done so for buildings: 16.2% *1

For driveways and parking: 7.6% *2 For roadways: 20.6% *3

*1. 4.5 acres cleared (4.5 / 27.7 = 16.2%) *2. 2.1 acres cleared (2.1 / 27.7 = 7.6%)

*3. 5.7 acres cleared (5.7 / 27.7 = 20.6%)

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

Approximately 40% of the site development area was all ready cleared and used as soil borrow area.

The remaining area is designed within ordinance guidelines and perimeter buffers remain in place.

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: _____ HSG B: 83.1%*2 HSG C: 16.9%*1 HSG D: _____

*1. 8.2 acres, Woodstown (8.2 / 48.42 = 16.9%)

*2. 40.22 acres, Downer & Aura (40.22 / 48.42 = 83.1%)

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: _____ HSG B: 90% HSG C: 100% HSG D: _____

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

Approximately 40% of the site was previously cleared and disturbed to support a soil borrow pit.

Basins are placed within "B" soils to promote water quality and infiltration.

I. Does the site include Karst topography? Yes: _____ No: X

If yes, discuss measures taken to limit Karst impacts:

3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: 0.2 acres Proposed: 17.8 acres*

* Of the 17.8 acres impervious cover, 3.6 acres = water surface of wet pond basin number 3.

B. Specify maximum site impervious coverage allowed by regulations: See below

Individual Residential Townhouse Lot = 75%

Overall development not specified

C. Compare proposed street cartway widths with those required by regulations:

Type of Street	Proposed Cartway Width (feet)	Required Cartway Width (feet)
Residential access – low intensity		
Residential access – medium intensity	30 feet	28 feet
Residential access – high intensity with parking		
Residential access – high intensity without parking		
Neighborhood		
Minor collector – low intensity without parking		
Minor collector – with one parking lane		
Minor collector – with two parking lanes		
Minor collector – without parking		
Major collector		

Multifamily Access Cul-De-Sac 30 feet

Multifamily Court Limited to 300 feet in length; proposed = 255 feet maximum

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: See below Regulations: 10' x 20' Board may grant 9" x18'

Off Street residential spaces = 9' x 18'

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: Residential = 691* Regulations: 2.4 spaces per unit (244 x 2.4 = 586)

* includes driveway spaces, garage spaces and 9' x 18' off street spaces.

Off street visitor parking = 122

F. Specify percentage of total site impervious cover created by buildings: 11.1% *1

By driveways and parking: 4.4% *2 By roadways: 10.4% *3

*1. 5.37 acres buildings (5.37 / 48.42 = 11.1%) *2. 2.11 acres drives and parking 2.11 / 48.42 = 4.4%)

*3. 5.05 acres roads (5.05 / 48.42 = 10.4%)

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

Reduction in building size, walkways, loading and parking would not be practical, the development is designed in accordance to need and pedestrian and vehicular safety. The site is also designed with in ordinance standards.

H. Specify percentage of total impervious area that will be unconnected:

Total site: 5.6% Buildings: 5.6% Driveways and parking: 0% Roads: 0%

Roof runoff from units to the rear yards will be considered unconnected, 2.69 Acres/48.42 = 5.6%

I. Specify percentage of total impervious area that will be porous:

Total site: 0% Buildings: 0% Driveways and parking: 0% Roads: 0%

J. Specify percentage of total building roof area that will be vegetated: 0%

K. Specify percentage of total parking area located beneath buildings: 0%

L. Specify percentage of total parking located within multi-level parking deck: 0%

3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: 54.5% *1 Vegetated swale: 31.5% *1 Natural channel: _____

Stormwater management facility: 14% *1 Other: _____

*1 Storm sewer = 6,681 feet, vegetated swale = 3,860 feet, and stormwater management basins = 1,720 feet

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

Storm sewer is required to collect and control concentrated flows within the roadways and parking areas. Vegetated swales have been designed where possible.

C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: Runoff flow slopes have been held at slopes necessary to promote positive drainage while limiting scour velocities. Reduction in slope below that proposed may create unwanted ponded areas and mosquito breeding.

Increase overland flow roughness: Overland roughness will be enhance through the establishment and maintenance of dense turf cover.

3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

A. Trash Receptacles

Specify the number of trash receptacles provided: N/A

Specify the spacing between the trash receptacles: N/A

Compare trash receptacles proposed with those required by regulations:

Proposed: N/A Regulations: N/A

B. Pet Waste Stations

Specify the number of pet waste stations provided: N/A

Specify the spacing between the pet waste stations: N/A

Compare pet waste stations proposed with those required by regulations:

Proposed: N/A Regulations: N/A

C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: 100%

D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: Monroe Township Regulations: Not specified

Litter collection: Proposed: Owner/Applicant Regulations: Not specified

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

Stormwater management maintenance measures are subject to the Stormwater Maintenance Manual prepared for this development.

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

No.	Nonstructural Strategy	Yes	No
1.	Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.	X	
2.	Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.	X	
3.	Maximize the protection of natural drainage features and vegetation.	X	
4.	Minimize the decrease in the pre-construction time of concentration.	X	
5.	Minimize land disturbance including clearing and grading.	X	
6.	Minimize soil compaction.	X	
7.	Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.	X	
8.	Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.	X	
9.	Provide preventative source controls.	X	

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

NJDEP NON STRUCTURAL STRATEGIES POINTS SYSTEM CALCULATION

NJDEP Nonstructural Strategies Points System (NSPS)

Version: January 31, 2006

Note: Input Values in Yellow Cells Only

Project:	Blaze Mill Townhouse Development
Date:	March 27, 2015
User:	GMM
Notes:	Project Number 2958
	Monroe Toiwnship
	Gloucester County, New Jersey

Step 1 - Provide Basic Major Development Site Information

A. Specify Total Area in Acres of Development Site Described in Steps 2 and 3 = 62.2 **Acres**

B. Specify by Percent the Various Planning Areas Located within the Development Site:

State Plan Planning Area:	PA-1	PA-2	PA-3	PA-4	PA-4B	PA-5	Total % Area
Percent of Each Planning Area within Site:		100.0%					100.0%

Note: See User's Guide for Equivalent Zones within Designated Centers and the NJ Meadowlands, Pinelands, and Highlands Districts

Step 2 - Describe Existing or Pre-Developed Site Conditions

A. Specify Existing Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG: HSG A	HSG B	HSG C	HSG D	Use/Cover Subtotals	Points
1	Wetlands and Undisturbed Stream Buffers		1.7			1.7	16
2	Lawn and Open Space		0.7			0.7	4
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range		22.2	5.7		27.9	181
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous		9.8	5.4		15.2	101
8	Woods - Planted					0.0	0
9	Woods and Grass Combination					0.0	0
10	Ponds, Lakes, and Other Open Water					0.0	0
11	Gravel and Dirt		16.5			16.5	53
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious		0.2			0.2	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
	HSG Subtotals (Acres):	0.0	51.1	11.1	0.0	**Total Area:**	62.2
	HSG Subtotals (%):	0.0%	82.2%	17.8%	0.0%	**Total % Area:**	100.0%

Points Subtotal: 355

Total Existing Site Points: 355

Step 3 - Describe Proposed or Post-Developed Site Conditions

A. Specify Proposed Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG: HSG A	HSG B	HSG C	HSG D	Use/Cover Subtotals	Points
1	Wetlands and Undisturbed Stream Buffers		1.7			1.7	16
2	Lawn and Open Space		23.3	4.3		27.6	140
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range		4.1	4.0		8.1	48
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous		5.9	1.1		7.0	50
8	Woods - Planted					0.0	0
9	Woods and Grass Combination					0.0	0
10	Ponds, Lakes, and Other Open Water		3.6			3.6	27
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious		14.2			14.2	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
	HSG Subtotals (Acres):	0.0	52.8	9.4	0.0	**Total Area:**	62.2
	HSG Subtotals (%):	0.0%	84.9%	15.1%	0.0%	**Total % Area:**	100.0%

NOTE: POST-DEVELOPED HSG AREAS DO NOT EQUAL PRE-DEVELOPED

Points Subtotal: 280

B. Compare Proposed Impervious Coverage with Maximum Allowable Impervious Coverage:

Total Directly Connected Impervious Coverage =	23%	% of Site
Total Unconnected Impervious Coverage with Small D/S Pervious =	0%	% of Site
Total Unconnected Impervious Coverage with Large D/S Pervious =	0%	% of Site
Total Site Impervious Coverage =	23%	% of Site
Effective Site Impervious Coverage =	23%	% of Site
Specify Source of Maximum Allowable Impervious Coverage:	None	(None or Table)

Points Subtotal: 0

C. Compare Proposed Site Disturbance with Maximum Allowable Site Disturbance:

Total Proposed Site Disturbance =	0%	% of Site
Maximum Allowable Site Disturbance by Municipal Ordinance =	0%	% of Site

Points Subtotal: 0

D. Describe Proposed Runoff Conveyance System:

Total Length of Runoff Conveyance System =	12261	Feet
Length of Vegetated Runoff Conveyance System =	3860	Feet
% of Total Runoff Conveyance System That is Vegetated =	31%	

Points Subtotal: 40

E. Residential Lot Clustering:

Percent of Total Site Area that will be Clustered =	0%	% of Site
Minimum Standard Lot Size as Per Zoning (Note: 1/2 Acre or Greater) =	0.000	Acres
Maximum Proposed Cluster Lot Size (Note:1/4 Acre or Less) =	0.000	Acres
Percent of Clustered Portion of Site to be Preserved as Vegetated Open Space =	0%	% of Clustered Site Portion

Points Subtotal: 0

F. Will the Following be Utilized to Minimize Soil Compaction?

Proposed Lawn Areas will be Graded with Lightweight Construction Equipment:	Yes	(Yes or No)
Percent of Proposed Lawn Areas to be Graded with Such Equipment:	100%	% of Lawn Areas

Points Subtotal: 32

G. Are Any of the Following Stormwater Management Standards Met Using Only Nonstructural Strategies and Measures?

Groundwater Recharge Standards (NJAC 7:8-5.4-a-2):	No	(Yes or No)
Stormwater Runoff Quality Standards (NJAC 7:8-5.5):	No	(Yes or No)
Stormwater Runoff Quantity Standards (NJAC 7:8-5.4-a-3):	No	(Yes or No)

Points Subtotal: 0

Note: If the Answers to All Three Questions at G Above are "Yes", Adequate Nonstructural Measures have been Utilized.

Total Proposed Site Points: 352

Ratio of Proposed to Existing Site Points: 99%

Required Site Points Ratio: 95%

Nonstructural Point System Results: **Proposed Nonstructural Measures are Adequate**

SECTION "C"

STORMWATER BASIN CALCULATIONS

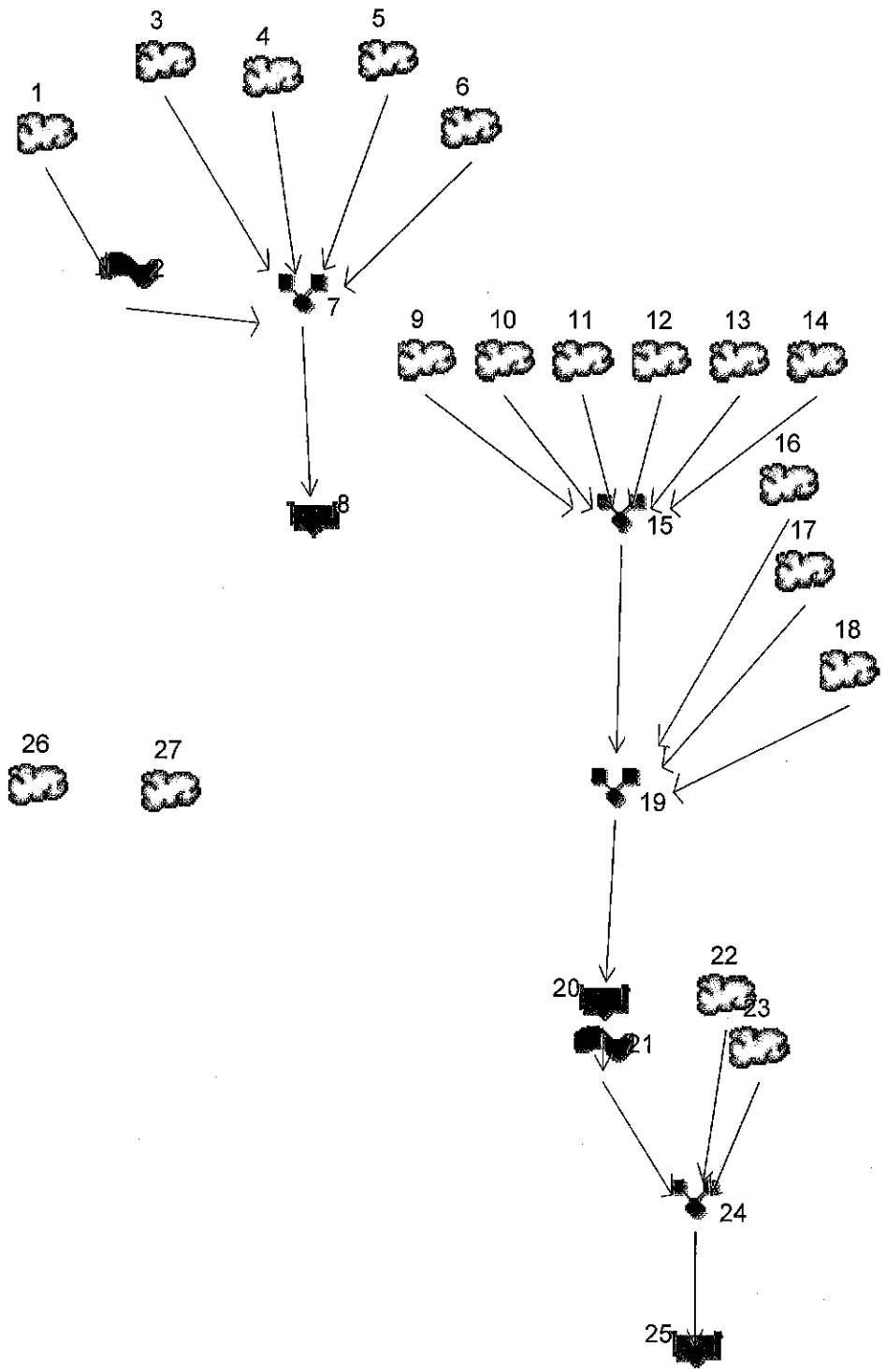
- BASIN QUANTITY CALCULATIONS
- BASIN QUALITY CALCULATIONS
- GROUNDWATER RECHARGE CALCULATIONS
- BASIN SPILLWAY CALCULATIONS
- BASIN INFILTRATION CALCULATIONS
- SOIL BORING LOGS WITH PERMEABILITY RESULTS

BASIN QUANTITY

CALCULATIONS

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8



Project: 2015-03-27_Quantity Calculations.gpw	Monday, Mar 23, 2015

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Pond No. 1 - Basin 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 131.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	131.00	19,470	0	0
1.00	132.00	21,658	20,552	20,552
2.00	133.00	23,900	22,768	43,320
3.00	134.00	26,826	25,346	68,666
4.00	135.00	29,328	28,065	96,731
5.00	136.00	31,887	30,596	127,327
6.00	137.00	34,506	33,184	160,511
7.00	138.00	37,183	35,833	196,344
8.00	139.00	40,579	38,865	235,209

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 42.00	0.00	0.00	0.00
Span (in)	= 42.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 133.37	0.00	0.00	0.00
Length (ft)	= 65.00	0.00	0.00	0.00
Slope (%)	= 0.18	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	1.00	100.00	0.00
Crest El. (ft)	= 138.05	133.50	138.10	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	Broad	---
Multi-Stage	= Yes	Yes	Yes	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	131.00	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
1.00	20,552	132.00	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
2.00	43,320	133.00	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
3.00	68,666	134.00	0.97 oc	---	---	---	0.00	0.97 s	0.00	---	---	---	0.967
4.00	96,731	135.00	4.77 oc	---	---	---	0.00	4.74 s	0.00	---	---	---	4.741
5.00	127,327	136.00	9.83 oc	---	---	---	0.00	9.83 s	0.00	---	---	---	9.835
6.00	160,511	137.00	15.65 oc	---	---	---	0.00	15.59 s	0.00	---	---	---	15.59
7.00	196,344	138.00	21.11 oc	---	---	---	0.00	21.10 s	0.00	---	---	---	21.10
8.00	235,209	139.00	84.11 oc	---	---	---	10.83 s	5.12 s	68.00 s	---	---	---	83.96

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Pond No. 2 - Basin 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 130.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	130.00	58,452	0	0
1.00	131.00	64,484	61,437	61,437
2.00	132.00	69,040	66,742	128,180
3.00	133.00	73,683	71,342	199,521
4.00	134.00	77,713	75,682	275,203

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 38.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 127.00	0.00	0.00	0.00
Length (ft)	= 56.00	0.00	0.00	0.00
Slope (%)	= 9.82	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	9.00	100.00	0.00
Crest El. (ft)	= 132.75	131.75	132.80	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= 1	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	130.00	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
1.00	61,437	131.00	43.13 ic	---	---	---	0.00	0.00	0.00	---	---	---	0.000
2.00	128,180	132.00	43.13 ic	---	---	---	0.00	3.75	0.00	---	---	---	3.746
3.00	199,521	133.00	48.13 ic	---	---	---	6.24	41.88	23.25	---	---	---	71.38
4.00	275,203	134.00	73.86 ic	---	---	---	34.17 s	39.68 s	341.78	---	---	---	415.62

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Pond No. 3 - Basin 3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 129.75 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	129.75	178,564	0	0
0.25	130.00	180,041	44,821	44,821
1.25	131.00	186,013	183,001	227,822
2.25	132.00	192,049	189,004	416,826
3.25	133.00	198,063	195,029	611,854

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 129.75	0.00	0.00	0.00
Length (ft)	= 83.00	0.00	0.00	0.00
Slope (%)	= 0.33	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	0.25	100.00	0.00
Crest El. (ft)	= 132.25	129.75	132.50	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= 1	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	129.75	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
0.25	44,821	130.00	0.09 oc	---	---	---	0.00	0.09 s	0.00	---	---	---	0.087
1.25	227,822	131.00	1.04 oc	---	---	---	0.00	1.04 s	0.00	---	---	---	1.037
2.25	416,826	132.00	2.48 oc	---	---	---	0.00	2.48 s	0.00	---	---	---	2.478
3.25	611,854	133.00	8.02 oc	---	---	---	7.36 s	0.63 s	91.92	---	---	---	99.92

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.717	2	776	22,978	------	------	------	Pre Development Commercial
2	Reach	0.007	2	776	9	1	------	------	Travel Time Commercial Area
3	SCS Runoff	3.268	2	752	25,362	------	------	------	EW-1 Pervious
4	SCS Runoff	16.33	2	728	77,098	------	------	------	EW-1 Impervious
5	SCS Runoff	0.651	2	746	4,622	------	------	------	Overland Basin 1 Pervious
6	SCS Runoff	0.413	2	728	1,950	------	------	------	Overland Basin 1 Impervious
7	Combine	18.56	2	728	109,042	2, 3, 4, 5, 6	------	------	Composite to Flow Basin 1
8	Reservoir	1.569	2	914	53,023	7	134.22	74,769	Rout Basin 1
9	SCS Runoff	0.767	2	748	5,883	------	------	------	EW-2 Pervious
10	SCS Runoff	8.748	2	728	41,303	------	------	------	EW-2 Impervious
11	SCS Runoff	0.100	2	738	618	------	------	------	EW-3 Pervious
12	SCS Runoff	3.280	2	726	13,276	------	------	------	EW-3 Impervious
13	SCS Runoff	0.953	2	752	8,362	------	------	------	EW-4 Pervious
14	SCS Runoff	6.901	2	728	32,583	------	------	------	EW-4 Impervious
15	Combine	19.46	2	728	102,025	9, 10, 11, 12, 13, 14	------	------	Composite Storm Sewer
16	SCS Runoff	0.827	2	750	6,603	------	------	------	Overland to Basin 2 Pervious
17	SCS Runoff	0.795	2	736	4,978	------	------	------	Overland to Basin 2 Impervious
18	SCS Runoff	4.031	2	730	21,020	------	------	------	Route 322 Road Runoff
19	Combine	24.45	2	728	134,626	15, 16, 17, 18	------	------	Composite to Basin 2
20	Reservoir	0.773	2	1110	26,449	19	131.83	116,907	Rout Basin 2
21	Reach	0.773	2	1112	26,270	20	------	------	Travel Time to Basin 3
22	SCS Runoff	0.853	2	746	6,302	------	------	------	Overland Basin 3 Pervious
23	SCS Runoff	9.283	2	728	43,827	------	------	------	Overland to Basin 3 Impervious
24	Combine	9.713	2	728	76,399	21, 22, 23	------	------	Composite to Basin 3
25	Reservoir	0.159	2	1740	34,842	24	130.12	66,368	Rout Basin 3
26	SCS Runoff	3.386	2	806	57,052	------	------	------	Pre Developed Area A
27	SCS Runoff	2.871	2	782	41,975	------	------	------	Pre Development Area B

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 1

Pre Development Commercial

Hydrograph type	= SCS Runoff	Peak discharge	= 1.717 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.93 hrs
Time interval	= 2 min	Hyd. volume	= 22,978 cuft
Drainage area	= 13.120 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 46.9 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(5.150 x 70) + (7.970 x 55)] / 13.120

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)	
12.67	1.578	13.23	1.657
12.70	1.615	13.27	1.642
12.73	1.646	13.30	1.627
12.77	1.670	13.33	1.611
12.80	1.688	13.37	1.593
12.83	1.702	13.40	1.574
12.87	1.710	13.43	1.555
12.90	1.715		
12.93	1.717	*...End*	
12.97	1.717		
13.00	1.715		
13.03	1.712		
13.07	1.706		
13.10	1.699		
13.13	1.691		
13.17	1.681		
13.20	1.669		

<<

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 1

Pre Development Commercial

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 36.82**	**+**	**0.00**	**+**	**0.00**	**=**	**36.82**
Shallow Concentrated Flow							
Flow length (ft)	= 120.00		530.00		220.00		
Watercourse slope (%)	= 0.50		0.90		0.50		
Surface description	= Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=1.14		1.53		1.44		
Travel Time (min)	**= 1.75**	**+**	**5.77**	**+**	**2.55**	**=**	**10.07**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 46.90 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 2

Travel Time Commercial Area

Hydrograph type	= Reach	Peak discharge	= 0.007 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.93 hrs
Time interval	= 2 min	Hyd. volume	= 9 cuft
Inflow hyd. No.	= 1 - Pre Development Commercial	Section type	= Circular
Reach length	= 1387.0 ft	Channel slope	= 0.01 %
Manning's n	= 0.013	Pipe diameter	= 30.00 ft
Side slope	= n/a	Max. depth	= n/a
Rating curve x	= 0.809	Rating curve m	= 1.250
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.0003

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
12.90	1.715	0.007
12.93	1.717 <<	0.007

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 3

EW-1 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 3.268 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.53 hrs
Time interval	= 2 min	Hyd. volume	= 25,362 cuft
Drainage area	= 9.500 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.5 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(5.340 x 61) + (4.160 x 74)] / 9.500

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.37	3.005
12.40	3.103
12.43	3.178
12.47	3.232
12.50	3.261
12.53	3.268
<<	
12.57	3.255
12.60	3.223
12.63	3.174
12.67	3.112
12.70	3.039
12.73	2.957

...End

TR55 Tc Worksheet

Hyd. No. 3

EW-1 Pervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 18.54**	**+**	**0.00**	**+**	**0.00**	**=**	**18.54**
Shallow Concentrated Flow							
Flow length (ft)	= 270.00		0.00		0.00		
Watercourse slope (%)	= 1.70		0.00		0.00		
Surface description	= Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=2.10		0.00		0.00		
Travel Time (min)	**= 2.14**	**+**	**0.00**	**+**	**0.00**	**=**	**2.14**
Channel Flow							
X sectional flow area (sqft)	= 1.22		4.91		4.91		
Wetted perimeter (ft)	= 3.93		7.85		7.85		
Channel slope (%)	= 0.30		0.34		0.30		
Manning's n-value	= 0.013		0.013		0.013		
Velocity (ft/s)	=2.86		4.88		4.58		
Flow length (ft)	({0})150.0		310.0		250.0		
Travel Time (min)	**= 0.87**	**+**	**1.06**	**+**	**0.91**	**=**	**2.84**

Total Travel Time, Tc ..... 23.50 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 4

EW-1 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 16.33 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 77,098 cuft
Drainage area	= 6.720 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.6 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(6.720 x 98)] / 6.720

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	14.93
12.10	16.10
12.13	16.33
<<	
12.17	15.95
12.20	15.27

...End

TR55 Tc Worksheet

Hyd. No. 4

EW-1 Impervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 0.40		0.00		0.00		
Travel Time (min)	**= 2.27**	**+**	**0.00**	**+**	**0.00**	**=**	**2.27**
Shallow Concentrated Flow							
Flow length (ft)	= 380.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=1.44		0.00		0.00		
Travel Time (min)	**= 4.41**	**+**	**0.00**	**+**	**0.00**	**=**	**4.41**
Channel Flow							
X sectional flow area (sqft)	= 7.07		0.00		0.00		
Wetted perimeter (ft)	= 9.42		0.00		0.00		
Channel slope (%)	= 0.39		0.00		0.00		
Manning's n-value	= 0.013		0.015		0.015		
Velocity (ft/s)	=5.91						
			0.00				
					0.00		
Flow length (ft)	({0})690.0		0.0		0.0		
Travel Time (min)	**= 1.95**	**+**	**0.00**	**+**	**0.00**	**=**	**1.95**

Total Travel Time, Tc ..... 8.60 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 5

Overland Basin 1 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.651 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.43 hrs
Time interval	= 2 min	Hyd. volume	= 4,622 cuft
Drainage area	= 2.390 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.4 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.060 x 55) + (2.070 x 61) + (0.260 x 74)] / 2.390

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.30	0.596
12.33	0.620
12.37	0.637
12.40	0.648
12.43	0.651
<<	
12.47	0.646
12.50	0.634
12.53	0.615
12.57	0.590

...End

TR55 Tc Worksheet

Hyd. No. 5

Overland Basin 1 Pervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 1.70		0.00		0.00		
Travel Time (min)	**= 15.00**	**+**	**0.00**	**+**	**0.00**	**=**	**15.00**
Shallow Concentrated Flow							
Flow length (ft)	= 50.00		0.00		0.00		
Watercourse slope (%)	= 1.70		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.10		0.00		0.00		
Travel Time (min)	**= 0.40**	**+**	**0.00**	**+**	**0.00**	**=**	**0.40**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 15.40 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 6

Overland Basin 1 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.413 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 1,950 cuft
Drainage area	= 0.170 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.9 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.170 x 98)] / 0.170

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	0.378
12.10	0.407
12.13	0.413
<<	
12.17	0.404
12.20	0.386

...End

TR55 Tc Worksheet

Hyd. No. 6

Overland Basin 1 Impervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 60.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 3.00		0.00		0.00		
Travel Time (min)	**= 7.94**	**+**	**0.00**	**+**	**0.00**	**=**	**7.94**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.90 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 7

Composite to Flow Basin 1

Hydrograph type	= Combine	Peak discharge	= 18.56 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 109,042 cuft
Inflow hyds.	= 2, 3, 4, 5, 6	Contrib. drain. area	= 18.780 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 2 + (cfs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 = (cfs)	Outflow (cfs)
12.10	0.000	1.188	16.10	0.274	0.407	17.96
12.13	0.000	1.463	16.33 <<	0.355	0.413 <<	18.56
12.17	0.000	1.750	15.95	0.428	0.404	18.53
12.20	0.000	2.039	15.27	0.486	0.386	18.18
12.23	0.000	2.315	14.46	0.530	0.366	17.67
12.27	0.000	2.552	13.54	0.566	0.343	17.00

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 8

Rout Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 1.569 cfs
Storm frequency	= 2 yrs	Time to peak	= 15.23 hrs
Time interval	= 2 min	Hyd. volume	= 53,023 cuft
Inflow hyd. No.	= 7 - Composite to Flow Basin 1	Reservoir name	= Basin 1
Max. Elevation	= 134.22 ft	Max. Storage	= 74,769 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
14.03	2.188	134.17	1.467	-----	-----	-----	-----	1.415	-----	-----	-----	1.415
14.07	2.159	134.17	1.479	-----	-----	-----	-----	1.425	-----	-----	-----	1.425
14.10	2.132	134.17	1.490	-----	-----	-----	-----	1.434	-----	-----	-----	1.434
14.13	2.106	134.18	1.501	-----	-----	-----	-----	1.442	-----	-----	-----	1.442
14.17	2.082	134.18	1.511	-----	-----	-----	-----	1.450	-----	-----	-----	1.450
14.20	2.059	134.18	1.521	-----	-----	-----	-----	1.458	-----	-----	-----	1.458
14.23	2.038	134.18	1.530	-----	-----	-----	-----	1.466	-----	-----	-----	1.466
14.27	2.017	134.19	1.539	-----	-----	-----	-----	1.473	-----	-----	-----	1.473
14.30	1.998	134.19	1.548	-----	-----	-----	-----	1.479	-----	-----	-----	1.479
14.33	1.979	134.19	1.556	-----	-----	-----	-----	1.486	-----	-----	-----	1.486
14.37	1.961	134.19	1.563	-----	-----	-----	-----	1.492	-----	-----	-----	1.492
14.40	1.944	134.20	1.570	-----	-----	-----	-----	1.498	-----	-----	-----	1.498
14.43	1.927	134.20	1.577	-----	-----	-----	-----	1.503	-----	-----	-----	1.503
14.47	1.910	134.20	1.584	-----	-----	-----	-----	1.508	-----	-----	-----	1.508
14.50	1.894	134.20	1.590	-----	-----	-----	-----	1.514	-----	-----	-----	1.514
14.53	1.878	134.20	1.595	-----	-----	-----	-----	1.519	-----	-----	-----	1.519
14.57	1.862	134.20	1.599	-----	-----	-----	-----	1.524	-----	-----	-----	1.524
14.60	1.846	134.21	1.604	-----	-----	-----	-----	1.529	-----	-----	-----	1.529
14.63	1.831	134.21	1.608	-----	-----	-----	-----	1.533	-----	-----	-----	1.533
14.67	1.815	134.21	1.612	-----	-----	-----	-----	1.537	-----	-----	-----	1.537

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
14.70	1.800	134.21	1.615	-----	-----	-----	-----	1.541	-----	-----	-----	1.541
14.73	1.785	134.21	1.619	-----	-----	-----	-----	1.545	-----	-----	-----	1.545
14.77	1.770	134.21	1.622	-----	-----	-----	-----	1.548	-----	-----	-----	1.548
14.80	1.755	134.21	1.625	-----	-----	-----	-----	1.551	-----	-----	-----	1.551
14.83	1.740	134.21	1.627	-----	-----	-----	-----	1.554	-----	-----	-----	1.554
14.87	1.725	134.21	1.630	-----	-----	-----	-----	1.556	-----	-----	-----	1.556
14.90	1.711	134.21	1.632	-----	-----	-----	-----	1.559	-----	-----	-----	1.559
14.93	1.696	134.21	1.634	-----	-----	-----	-----	1.561	-----	-----	-----	1.561
14.97	1.681	134.22	1.636	-----	-----	-----	-----	1.563	-----	-----	-----	1.563
15.00	1.667	134.22	1.637	-----	-----	-----	-----	1.564	-----	-----	-----	1.564
15.03	1.652	134.22	1.638	-----	-----	-----	-----	1.566	-----	-----	-----	1.566
15.07	1.638	134.22	1.639	-----	-----	-----	-----	1.567	-----	-----	-----	1.567
15.10	1.623	134.22	1.640	-----	-----	-----	-----	1.568	-----	-----	-----	1.568
15.13	1.609	134.22	1.641	-----	-----	-----	-----	1.568	-----	-----	-----	1.568
15.17	1.594	134.22	1.641	-----	-----	-----	-----	1.569	-----	-----	-----	1.569
15.20	1.580	134.22	1.642	-----	-----	-----	-----	1.569	-----	-----	-----	1.569
15.23	1.565	134.22 <<	1.642	-----	-----	-----	-----	1.569	-----	-----	-----	1.569
15.27	1.550	134.22	1.642	-----	-----	-----	-----	1.569	-----	-----	-----	1.569
15.30	1.536	134.22	1.641	-----	-----	-----	-----	1.569	-----	-----	-----	1.569
15.33	1.521	134.22	1.641	-----	-----	-----	-----	1.568	-----	-----	-----	1.568
15.37	1.506	134.22	1.640	-----	-----	-----	-----	1.567	-----	-----	-----	1.567
15.40	1.492	134.22	1.639	-----	-----	-----	-----	1.566	-----	-----	-----	1.566
15.43	1.477	134.22	1.638	-----	-----	-----	-----	1.565	-----	-----	-----	1.565
15.47	1.462	134.22	1.637	-----	-----	-----	-----	1.564	-----	-----	-----	1.564
15.50	1.447	134.22	1.635	-----	-----	-----	-----	1.562	-----	-----	-----	1.562
15.53	1.432	134.21	1.633	-----	-----	-----	-----	1.560	-----	-----	-----	1.560

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
15.57	1.417	134.21	1.632	-----	-----	-----	-----	1.558	-----	-----	-----	1.558
15.60	1.402	134.21	1.630	-----	-----	-----	-----	1.556	-----	-----	-----	1.556
15.63	1.387	134.21	1.627	-----	-----	-----	-----	1.554	-----	-----	-----	1.554
15.67	1.372	134.21	1.625	-----	-----	-----	-----	1.552	-----	-----	-----	1.552
15.70	1.357	134.21	1.623	-----	-----	-----	-----	1.549	-----	-----	-----	1.549
15.73	1.342	134.21	1.620	-----	-----	-----	-----	1.546	-----	-----	-----	1.546
15.77	1.327	134.21	1.617	-----	-----	-----	-----	1.543	-----	-----	-----	1.543
15.80	1.312	134.21	1.614	-----	-----	-----	-----	1.540	-----	-----	-----	1.540
15.83	1.297	134.21	1.611	-----	-----	-----	-----	1.536	-----	-----	-----	1.536
15.87	1.282	134.21	1.608	-----	-----	-----	-----	1.533	-----	-----	-----	1.533
15.90	1.266	134.21	1.604	-----	-----	-----	-----	1.529	-----	-----	-----	1.529
15.93	1.251	134.20	1.601	-----	-----	-----	-----	1.525	-----	-----	-----	1.525
15.97	1.236	134.20	1.597	-----	-----	-----	-----	1.521	-----	-----	-----	1.521
16.00	1.221	134.20	1.593	-----	-----	-----	-----	1.517	-----	-----	-----	1.517
16.03	1.205	134.20	1.589	-----	-----	-----	-----	1.513	-----	-----	-----	1.513
16.07	1.191	134.20	1.584	-----	-----	-----	-----	1.508	-----	-----	-----	1.508
16.10	1.176	134.20	1.579	-----	-----	-----	-----	1.504	-----	-----	-----	1.504
16.13	1.163	134.20	1.574	-----	-----	-----	-----	1.500	-----	-----	-----	1.500
16.17	1.151	134.20	1.568	-----	-----	-----	-----	1.496	-----	-----	-----	1.496
16.20	1.139	134.19	1.563	-----	-----	-----	-----	1.491	-----	-----	-----	1.491
16.23	1.128	134.19	1.557	-----	-----	-----	-----	1.487	-----	-----	-----	1.487
16.27	1.117	134.19	1.551	-----	-----	-----	-----	1.482	-----	-----	-----	1.482
16.30	1.107	134.19	1.546	-----	-----	-----	-----	1.478	-----	-----	-----	1.478
16.33	1.098	134.19	1.540	-----	-----	-----	-----	1.473	-----	-----	-----	1.473
16.37	1.089	134.19	1.534	-----	-----	-----	-----	1.468	-----	-----	-----	1.468
16.40	1.080	134.18	1.528	-----	-----	-----	-----	1.464	-----	-----	-----	1.464
16.43	1.072	134.18	1.522	-----	-----	-----	-----	1.459	-----	-----	-----	1.459

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
16.47	1.063	134.18	1.515	-----	-----	-----	-----	1.454	-----	-----	-----	1.454
16.50	1.055	134.18	1.509	-----	-----	-----	-----	1.449	-----	-----	-----	1.449
16.53	1.047	134.18	1.503	-----	-----	-----	-----	1.444	-----	-----	-----	1.444
16.57	1.040	134.18	1.497	-----	-----	-----	-----	1.439	-----	-----	-----	1.439
16.60	1.032	134.17	1.490	-----	-----	-----	-----	1.434	-----	-----	-----	1.434
16.63	1.024	134.17	1.484	-----	-----	-----	-----	1.429	-----	-----	-----	1.429
16.67	1.017	134.17	1.477	-----	-----	-----	-----	1.424	-----	-----	-----	1.424
16.70	1.010	134.17	1.471	-----	-----	-----	-----	1.418	-----	-----	-----	1.418
16.73	1.002	134.17	1.464	-----	-----	-----	-----	1.413	-----	-----	-----	1.413

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 9

EW-2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.767 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.47 hrs
Time interval	= 2 min	Hyd. volume	= 5,883 cuft
Drainage area	= 3.110 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.4 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(2.950 x 61) + (0.160 x 74)] / 3.110

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)	
12.33	0.693
12.37	0.722
12.40	0.745
12.43	0.759
12.47	0.767
<<	
12.50	0.766
12.53	0.758
12.57	0.744
12.60	0.723
12.63	0.699

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 9

EW-2 Pervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 1.50		0.00		0.00		
Travel Time (min)	**= 15.77**	**+**	**0.00**	**+**	**0.00**	**=**	**15.77**
Shallow Concentrated Flow							
Flow length (ft)	= 100.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=1.44		0.00		0.00		
Travel Time (min)	**= 1.16**	**+**	**0.00**	**+**	**0.00**	**=**	**1.16**
Channel Flow							
X sectional flow area (sqft)	= 1.77		5.11		0.00		
Wetted perimeter (ft)	= 4.71		8.34		0.00		
Channel slope (%)	= 0.40		0.79		0.00		
Manning's n-value	= 0.013		0.013		0.013		
Velocity (ft/s)	=3.76						
			7.34				
					0.00		
Flow length (ft)	({0})98.0		438.0		0.0		
Travel Time (min)	**= 0.43**	**+**	**0.99**	**+**	**0.00**	**=**	**1.43**

Total Travel Time, Tc ..... 18.40 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 10

EW-2 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 8.748 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 41,303 cuft
Drainage area	= 3.600 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.3 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.600 x 98)] / 3.600

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)	
12.07	8.000
12.10	8.623
12.13	8.748
<<	
12.17	8.546
12.20	8.182

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 10

EW-2 Impervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 2.08**	**+**	**0.00**	**+**	**0.00**	**=**	**2.08**
Shallow Concentrated Flow							
Flow length (ft)	= 240.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=1.44		0.00		0.00		
Travel Time (min)	**= 2.78**	**+**	**0.00**	**+**	**0.00**	**=**	**2.78**
Channel Flow							
X sectional flow area (sqft)	= 1.22		3.14		5.11		
Wetted perimeter (ft)	= 3.93		6.28		8.34		
Channel slope (%)	= 1.00		0.20		0.30		
Manning's n-value	= 0.013		0.013		0.013		
Velocity (ft/s)	=5.23		3.22		4.52		
Flow length (ft)	({0})314.0		158.0		438.0		
Travel Time (min)	**= 1.00**	**+**	**0.82**	**+**	**1.61**	**=**	**3.43**

Total Travel Time, Tc ..... 8.30 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 11

EW-3 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.100 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.30 hrs
Time interval	= 2 min	Hyd. volume	= 618 cuft
Drainage area	= 0.340 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.5 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.340 x 61)] / 0.340

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.20	0.093
12.23	0.097
12.27	0.099
12.30	0.100
<<	
12.33	0.098
12.37	0.095
12.40	0.091

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 11

EW-3 Pervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 25.0		75.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		3.30		0.00		
Land slope (%)	= 2.00		0.50		0.00		
Travel Time (min)	**= 4.64**	**+**	**1.65**	**+**	**0.00**	**=**	**6.29**
Shallow Concentrated Flow							
Flow length (ft)	= 40.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=1.44		0.00		0.00		
Travel Time (min)	**= 0.46**	**+**	**0.00**	**+**	**0.00**	**=**	**0.46**
Channel Flow							
X sectional flow area (sqft)	= 1.22		1.22		0.00		
Wetted perimeter (ft)	= 3.93		3.93		0.00		
Channel slope (%)	= 0.40		1.40		0.00		
Manning's n-value	= 0.013		0.013		0.013		
Velocity (ft/s)	=3.31						
			6.18				
					0.00		
Flow length (ft)	({0})336.0		15.0		0.0		
Travel Time (min)	**= 1.69**	**+**	**0.04**	**+**	**0.00**	**=**	**1.73**

Total Travel Time, Tc ..... 8.50 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 12

EW-3 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 3.280 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 13,276 cuft
Drainage area	= 1.200 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.4 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(1.200 x 98)] / 1.200

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	3.260
12.10	3.280
<<	
12.13	3.078

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 12

EW-3 Impervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 40.0		60.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		3.30		0.00		
Land slope (%)	= 5.00		0.50		0.00		
Travel Time (min)	**= 0.40**	**+**	**1.38**	**+**	**0.00**	**=**	**1.78**
Shallow Concentrated Flow							
Flow length (ft)	= 80.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=1.44		0.00		0.00		
Travel Time (min)	**= 0.93**	**+**	**0.00**	**+**	**0.00**	**=**	**0.93**
Channel Flow							
X sectional flow area (sqft)	= 1.22		1.22		0.00		
Wetted perimeter (ft)	= 3.93		3.93		0.00		
Channel slope (%)	= 0.40		1.40		0.00		
Manning's n-value	= 0.013		0.013		0.013		
Velocity (ft/s)	=3.31						
			6.18				
					0.00		
Flow length (ft)	({0})336.0		15.0		0.0		
Travel Time (min)	**= 1.69**	**+**	**0.04**	**+**	**0.00**	**=**	**1.73**

Total Travel Time, Tc ..... 4.40 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 13

EW-4 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.953 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.53 hrs
Time interval	= 2 min	Hyd. volume	= 8,362 cuft
Drainage area	= 4.700 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.5 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(4.680 x 61) + (0.020 x 74)] / 4.700

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.40	0.873
12.43	0.905
12.47	0.930
12.50	0.946
12.53	0.953
<<	
12.57	0.953
12.60	0.946
12.63	0.933
12.67	0.916
12.70	0.895
12.73	0.871

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 13

EW-4 Pervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 1.50		0.00		0.00		
Travel Time (min)	**= 15.77**	**+**	**0.00**	**+**	**0.00**	**=**	**15.77**
Shallow Concentrated Flow							
Flow length (ft)	= 220.00		0.00		0.00		
Watercourse slope (%)	= 2.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.28		0.00		0.00		
Travel Time (min)	**= 1.61**	**+**	**0.00**	**+**	**0.00**	**=**	**1.61**
Channel Flow							
X sectional flow area (sqft)	= 1.22		3.14		4.91		
Wetted perimeter (ft)	= 3.93		6.28		7.85		
Channel slope (%)	= 0.80		1.00		0.26		
Manning's n-value	= 0.013		0.013		0.013		
Velocity (ft/s)	=4.67		7.21		4.27		
Flow length (ft)	({0})382.0		267.0		545.0		
Travel Time (min)	**= 1.36**	**+**	**0.62**	**+**	**2.13**	**=**	**4.11**

Total Travel Time, Tc ..... 21.50 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 14

EW-4 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 6.901 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 32,583 cuft
Drainage area	= 2.840 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.1 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(2.840 x 98)] / 2.840

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	6.311
12.10	6.802
12.13	6.901
<<	
12.17	6.742
12.20	6.455

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 14

EW-4 Impervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 50.0		50.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		3.30		0.00		
Land slope (%)	= 5.00		0.50		0.00		
Travel Time (min)	**= 0.48**	**+**	**1.19**	**+**	**0.00**	**=**	**1.67**
Shallow Concentrated Flow							
Flow length (ft)	= 385.00		0.00		0.00		
Watercourse slope (%)	= 1.50		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=2.49		0.00		0.00		
Travel Time (min)	**= 2.58**	**+**	**0.00**	**+**	**0.00**	**=**	**2.58**
Channel Flow							
X sectional flow area (sqft)	= 1.77		3.14		4.91		
Wetted perimeter (ft)	= 4.71		6.28		7.85		
Channel slope (%)	= 1.50		1.00		0.26		
Manning's n-value	= 0.013		0.013		0.013		
Velocity (ft/s)	=7.28		7.21		4.27		
Flow length (ft)	({0})38.0		267.0		545.0		
Travel Time (min)	**= 0.09**	**+**	**0.62**	**+**	**2.13**	**=**	**2.83**

Total Travel Time, Tc ..... 7.10 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 15

Composite Storm Sewer

Hydrograph type	= Combine	Peak discharge	= 19.46 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 102,025 cuft
Inflow hyds.	= 9, 10, 11, 12, 13, 14	Contrib. drain. area	= 15.790 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 9 + (cfs)	Hyd. 10 + (cfs)	Hyd. 11 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 14 = (cfs)	Outflow (cfs)
12.07	0.180	8.000	0.050	3.260	0.153	6.311	17.96
12.10	0.258	8.623	0.068	3.280 <<	0.229	6.802	19.26
12.13	0.342	8.748 <<	0.080	3.078	0.315	6.901 <<	19.46
12.17	0.427	8.546	0.088	2.780	0.408	6.742	18.99
12.20	0.504	8.182	0.093	2.457	0.504	6.455	18.19

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 16

Overland to Basin 2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.827 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.50 hrs
Time interval	= 2 min	Hyd. volume	= 6,603 cuft
Drainage area	= 3.770 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.9 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.770 x 61)] / 3.770

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.37	0.767
12.40	0.794
12.43	0.814
12.47	0.825
12.50	0.827
12.53	0.822
12.57	0.808
12.60	0.789
12.63	0.764

<<

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 16

Overland to Basin 2 Pervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 1.50		0.00		0.00		
Travel Time (min)	**= 15.77**	**+**	**0.00**	**+**	**0.00**	**=**	**15.77**
Shallow Concentrated Flow							
Flow length (ft)	= 145.00		0.00		0.00		
Watercourse slope (%)	= 1.70		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.10		0.00		0.00		
Travel Time (min)	**= 1.15**	**+**	**0.00**	**+**	**0.00**	**=**	**1.15**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 16.90 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 17

Overland to Basin 2 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.795 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 4,978 cuft
Drainage area	= 0.450 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.8 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.450 x 98)] / 0.450

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.17	0.740
12.20	0.775
12.23	0.791
12.27	0.795
<<	
12.30	0.791
12.33	0.781
12.37	0.767
12.40	0.749
12.43	0.726

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 17

Overland to Basin 2 Impervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 1.50		0.00		0.00		
Travel Time (min)	**= 15.77**	**+**	**0.00**	**+**	**0.00**	**=**	**15.77**
Shallow Concentrated Flow							
Flow length (ft)	= 125.00		0.00		0.00		
Watercourse slope (%)	= 1.70		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.10		0.00		0.00		
Travel Time (min)	**= 0.99**	**+**	**0.00**	**+**	**0.00**	**=**	**0.99**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00		0.00		0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 16.80 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 18

Route 322 Road Runoff

Hydrograph type	= SCS Runoff	Peak discharge	= 4.031 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 21,020 cuft
Drainage area	= 1.900 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.0 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(1.900 x 98)] / 1.900

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.10	3.742
12.13	3.966
12.17	4.031
<<	
12.20	3.988
12.23	3.888
12.27	3.756

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 19

Composite to Basin 2

Hydrograph type	= Combine	Peak discharge	= 24.45 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 134,626 cuft
Inflow hyds.	= 15, 16, 17, 18	Contrib. drain. area	= 6.120 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 15 + (cfs)	Hyd. 16 + (cfs)	Hyd. 17 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
12.07	17.96	0.166	0.556	3.363	22.04
12.10	19.26	0.247	0.624	3.742	23.87
12.13	19.46 <<	0.337	0.688	3.966	24.45
<<					
12.17	18.99	0.428	0.740	4.031 <<	24.19
12.20	18.19	0.513	0.775	3.988	23.47
12.23	17.25	0.584	0.791	3.888	22.51

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 20

Rout Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 0.773 cfs
Storm frequency	= 2 yrs	Time to peak	= 18.50 hrs
Time interval	= 2 min	Hyd. volume	= 26,449 cuft
Inflow hyd. No.	= 19 - Composite to Basin 2	Reservoir name	= Basin 2
Max. Elevation	= 131.83 ft	Max. Storage	= 116,907 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
17.53	0.958	131.83	0.702	-----	-----	-----	-----	0.701	-----	-----	-----	0.701
17.57	0.950	131.83	0.708	-----	-----	-----	-----	0.708	-----	-----	-----	0.708
17.60	0.942	131.83	0.714	-----	-----	-----	-----	0.714	-----	-----	-----	0.714
17.63	0.934	131.83	0.719	-----	-----	-----	-----	0.719	-----	-----	-----	0.719
17.67	0.926	131.83	0.725	-----	-----	-----	-----	0.725	-----	-----	-----	0.725
17.70	0.918	131.83	0.730	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
17.73	0.910	131.83	0.734	-----	-----	-----	-----	0.734	-----	-----	-----	0.734
17.77	0.902	131.83	0.739	-----	-----	-----	-----	0.738	-----	-----	-----	0.738
17.80	0.894	131.83	0.743	-----	-----	-----	-----	0.742	-----	-----	-----	0.742
17.83	0.886	131.83	0.746	-----	-----	-----	-----	0.746	-----	-----	-----	0.746
17.87	0.878	131.83	0.750	-----	-----	-----	-----	0.749	-----	-----	-----	0.750
17.90	0.870	131.83	0.753	-----	-----	-----	-----	0.753	-----	-----	-----	0.753
17.93	0.862	131.83	0.756	-----	-----	-----	-----	0.755	-----	-----	-----	0.755
17.97	0.854	131.83	0.758	-----	-----	-----	-----	0.758	-----	-----	-----	0.758
18.00	0.846	131.83	0.761	-----	-----	-----	-----	0.760	-----	-----	-----	0.760
18.03	0.839	131.83	0.763	-----	-----	-----	-----	0.762	-----	-----	-----	0.762
18.07	0.831	131.83	0.765	-----	-----	-----	-----	0.764	-----	-----	-----	0.764
18.10	0.824	131.83	0.766	-----	-----	-----	-----	0.766	-----	-----	-----	0.766
18.13	0.817	131.83	0.767	-----	-----	-----	-----	0.767	-----	-----	-----	0.767
18.17	0.812	131.83	0.769	-----	-----	-----	-----	0.768	-----	-----	-----	0.768

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
18.20	0.806	131.83	0.770	-----	-----	-----	-----	0.769	-----	-----	-----	0.769
18.23	0.801	131.83	0.771	-----	-----	-----	-----	0.770	-----	-----	-----	0.770
18.27	0.797	131.83	0.771	-----	-----	-----	-----	0.771	-----	-----	-----	0.771
18.30	0.793	131.83	0.772	-----	-----	-----	-----	0.772	-----	-----	-----	0.772
18.33	0.789	131.83	0.772	-----	-----	-----	-----	0.772	-----	-----	-----	0.772
18.37	0.785	131.83	0.773	-----	-----	-----	-----	0.772	-----	-----	-----	0.772
18.40	0.782	131.83	0.773	-----	-----	-----	-----	0.773	-----	-----	-----	0.773
18.43	0.779	131.83	0.773	-----	-----	-----	-----	0.773	-----	-----	-----	0.773
18.47	0.776	131.83	0.773	-----	-----	-----	-----	0.773	-----	-----	-----	0.773
18.50	0.773	131.83 <<	0.773	-----	-----	-----	-----	0.773	-----	-----	-----	0.773
<<												
18.53	0.770	131.83	0.773	-----	-----	-----	-----	0.773	-----	-----	-----	0.773
18.57	0.767	131.83	0.773	-----	-----	-----	-----	0.773	-----	-----	-----	0.773
18.60	0.765	131.83	0.773	-----	-----	-----	-----	0.773	-----	-----	-----	0.773
18.63	0.762	131.83	0.773	-----	-----	-----	-----	0.772	-----	-----	-----	0.772
18.67	0.760	131.83	0.772	-----	-----	-----	-----	0.772	-----	-----	-----	0.772
18.70	0.757	131.83	0.772	-----	-----	-----	-----	0.772	-----	-----	-----	0.772
18.73	0.755	131.83	0.772	-----	-----	-----	-----	0.771	-----	-----	-----	0.771
18.77	0.752	131.83	0.771	-----	-----	-----	-----	0.771	-----	-----	-----	0.771
18.80	0.750	131.83	0.771	-----	-----	-----	-----	0.771	-----	-----	-----	0.771
18.83	0.748	131.83	0.770	-----	-----	-----	-----	0.770	-----	-----	-----	0.770
18.87	0.745	131.83	0.770	-----	-----	-----	-----	0.769	-----	-----	-----	0.769
18.90	0.743	131.83	0.769	-----	-----	-----	-----	0.769	-----	-----	-----	0.769
18.93	0.741	131.83	0.768	-----	-----	-----	-----	0.768	-----	-----	-----	0.768
18.97	0.738	131.83	0.768	-----	-----	-----	-----	0.767	-----	-----	-----	0.767
19.00	0.736	131.83	0.767	-----	-----	-----	-----	0.767	-----	-----	-----	0.767
19.03	0.734	131.83	0.766	-----	-----	-----	-----	0.766	-----	-----	-----	0.766

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.07	0.731	131.83	0.765	-----	-----	-----	-----	0.765	-----	-----	-----	0.765
19.10	0.729	131.83	0.764	-----	-----	-----	-----	0.764	-----	-----	-----	0.764
19.13	0.727	131.83	0.763	-----	-----	-----	-----	0.763	-----	-----	-----	0.763
19.17	0.724	131.83	0.762	-----	-----	-----	-----	0.762	-----	-----	-----	0.762
19.20	0.722	131.83	0.762	-----	-----	-----	-----	0.761	-----	-----	-----	0.761
19.23	0.720	131.83	0.760	-----	-----	-----	-----	0.760	-----	-----	-----	0.760
19.27	0.717	131.83	0.759	-----	-----	-----	-----	0.759	-----	-----	-----	0.759
19.30	0.715	131.83	0.758	-----	-----	-----	-----	0.758	-----	-----	-----	0.758
19.33	0.713	131.83	0.757	-----	-----	-----	-----	0.757	-----	-----	-----	0.757
19.37	0.710	131.83	0.756	-----	-----	-----	-----	0.756	-----	-----	-----	0.756
19.40	0.708	131.83	0.755	-----	-----	-----	-----	0.755	-----	-----	-----	0.755
19.43	0.705	131.83	0.754	-----	-----	-----	-----	0.754	-----	-----	-----	0.753
19.47	0.703	131.83	0.753	-----	-----	-----	-----	0.752	-----	-----	-----	0.752
19.50	0.701	131.83	0.751	-----	-----	-----	-----	0.751	-----	-----	-----	0.751
19.53	0.698	131.83	0.750	-----	-----	-----	-----	0.750	-----	-----	-----	0.750
19.57	0.696	131.83	0.749	-----	-----	-----	-----	0.748	-----	-----	-----	0.748
19.60	0.694	131.83	0.747	-----	-----	-----	-----	0.747	-----	-----	-----	0.747
19.63	0.691	131.83	0.746	-----	-----	-----	-----	0.746	-----	-----	-----	0.746
19.67	0.689	131.83	0.745	-----	-----	-----	-----	0.744	-----	-----	-----	0.744
19.70	0.687	131.83	0.743	-----	-----	-----	-----	0.743	-----	-----	-----	0.743
19.73	0.684	131.83	0.742	-----	-----	-----	-----	0.742	-----	-----	-----	0.741
19.77	0.682	131.83	0.740	-----	-----	-----	-----	0.740	-----	-----	-----	0.740
19.80	0.680	131.83	0.739	-----	-----	-----	-----	0.739	-----	-----	-----	0.739
19.83	0.677	131.83	0.737	-----	-----	-----	-----	0.737	-----	-----	-----	0.737
19.87	0.675	131.83	0.736	-----	-----	-----	-----	0.736	-----	-----	-----	0.736
19.90	0.672	131.83	0.734	-----	-----	-----	-----	0.734	-----	-----	-----	0.734
19.93	0.670	131.83	0.733	-----	-----	-----	-----	0.732	-----	-----	-----	0.732

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Rout Basin 2

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.97	0.668	131.83	0.731	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
20.00	0.665	131.83	0.729	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
20.03	0.663	131.83	0.728	-----	-----	-----	-----	0.728	-----	-----	-----	0.728
20.07	0.661	131.83	0.726	-----	-----	-----	-----	0.726	-----	-----	-----	0.726
20.10	0.658	131.83	0.724	-----	-----	-----	-----	0.724	-----	-----	-----	0.724
20.13	0.656	131.83	0.723	-----	-----	-----	-----	0.723	-----	-----	-----	0.723
20.17	0.653	131.83	0.721	-----	-----	-----	-----	0.721	-----	-----	-----	0.721
20.20	0.651	131.83	0.719	-----	-----	-----	-----	0.719	-----	-----	-----	0.719
20.23	0.649	131.83	0.718	-----	-----	-----	-----	0.718	-----	-----	-----	0.717
20.27	0.646	131.83	0.716	-----	-----	-----	-----	0.716	-----	-----	-----	0.716
20.30	0.644	131.83	0.714	-----	-----	-----	-----	0.714	-----	-----	-----	0.714
20.33	0.642	131.83	0.712	-----	-----	-----	-----	0.712	-----	-----	-----	0.712
20.37	0.639	131.83	0.711	-----	-----	-----	-----	0.710	-----	-----	-----	0.710
20.40	0.637	131.83	0.709	-----	-----	-----	-----	0.709	-----	-----	-----	0.709
20.43	0.634	131.83	0.707	-----	-----	-----	-----	0.707	-----	-----	-----	0.707
20.47	0.632	131.83	0.705	-----	-----	-----	-----	0.705	-----	-----	-----	0.705
20.50	0.630	131.83	0.703	-----	-----	-----	-----	0.703	-----	-----	-----	0.703
20.53	0.627	131.83	0.701	-----	-----	-----	-----	0.701	-----	-----	-----	0.701
20.57	0.625	131.83	0.700	-----	-----	-----	-----	0.699	-----	-----	-----	0.699
20.60	0.622	131.83	0.698	-----	-----	-----	-----	0.697	-----	-----	-----	0.697

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 21

Travel Time to Basin 3

Hydrograph type	= Reach	Peak discharge	= 0.773 cfs
Storm frequency	= 2 yrs	Time to peak	= 18.53 hrs
Time interval	= 2 min	Hyd. volume	= 26,270 cuft
Inflow hyd. No.	= 20 - Rout Basin 2	Section type	= Circular
Reach length	= 63.0 ft	Channel slope	= 13.49 %
Manning's n	= 0.013	Pipe diameter	= 1.50 ft
Side slope	= n/a	Max. depth	= n/a
Rating curve x	= 24.304	Rating curve m	= 1.250
Ave. velocity	= 0.44 ft/s	Routing coeff.	= 0.6849

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
17.57	0.708	0.698
17.60	0.714	0.705
17.63	0.719	0.711
17.67	0.725	0.717
17.70	0.730	0.722
17.73	0.734	0.727
17.77	0.738	0.732
17.80	0.742	0.736
17.83	0.746	0.741
17.87	0.750	0.744
17.90	0.753	0.748
17.93	0.755	0.751
17.97	0.758	0.754
18.00	0.760	0.757
18.03	0.762	0.759
18.07	0.764	0.761

Continues on next page...

Travel Time to Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
18.10	0.766	0.763
18.13	0.767	0.765
18.17	0.768	0.766
18.20	0.769	0.768
18.23	0.770	0.769
18.27	0.771	0.770
18.30	0.772	0.771
18.33	0.772	0.771
18.37	0.772	0.772
18.40	0.773	0.772
18.43	0.773	0.773
18.47	0.773	0.773
18.50	0.773 <<	0.773
18.53	0.773	0.773
18.57	0.773	0.773
18.60	0.773	0.773
18.63	0.772	0.773
18.67	0.772	0.773
18.70	0.772	0.772
18.73	0.771	0.772
18.77	0.771	0.772
18.80	0.771	0.771
18.83	0.770	0.771
18.87	0.769	0.770
18.90	0.769	0.770
18.93	0.768	0.769

Continues on next page...

Travel Time to Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
18.97	0.767	0.768
19.00	0.767	0.768
19.03	0.766	0.767
19.07	0.765	0.766
19.10	0.764	0.765
19.13	0.763	0.764
19.17	0.762	0.764
19.20	0.761	0.763
19.23	0.760	0.762
19.27	0.759	0.761
19.30	0.758	0.760
19.33	0.757	0.759
19.37	0.756	0.758
19.40	0.755	0.756
19.43	0.753	0.755
19.47	0.752	0.754
19.50	0.751	0.753
19.53	0.750	0.752
19.57	0.748	0.750
19.60	0.747	0.749
19.63	0.746	0.748
19.67	0.744	0.746
19.70	0.743	0.745
19.73	0.741	0.744
19.77	0.740	0.742
19.80	0.739	0.741

Continues on next page...

Travel Time to Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
19.83	0.737	0.739
19.87	0.736	0.738
19.90	0.734	0.736
19.93	0.732	0.735
19.97	0.731	0.733
20.00	0.729	0.732
20.03	0.728	0.730
20.07	0.726	0.728
20.10	0.724	0.727
20.13	0.723	0.725
20.17	0.721	0.723
20.20	0.719	0.722
20.23	0.717	0.720
20.27	0.716	0.718
20.30	0.714	0.716
20.33	0.712	0.715
20.37	0.710	0.713
20.40	0.709	0.711
20.43	0.707	0.709
20.47	0.705	0.708
20.50	0.703	0.706
20.53	0.701	0.704
20.57	0.699	0.702
20.60	0.697	0.700
20.63	0.696	0.698
20.67	0.694	0.696

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 22

Overland Basin 3 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.853 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.43 hrs
Time interval	= 2 min	Hyd. volume	= 6,302 cuft
Drainage area	= 3.520 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.6 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.520 x 61)] / 3.520

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.33	0.800
12.37	0.827
12.40	0.845
12.43	0.853
<<	
12.47	0.851
12.50	0.838
12.53	0.816
12.57	0.786

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 22

Overland Basin 3 Pervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 1.70		0.00		0.00		
Travel Time (min)	**= 15.00**	**+**	**0.00**	**+**	**0.00**	**=**	**15.00**
Shallow Concentrated Flow							
Flow length (ft)	= 80.00		0.00		0.00		
Watercourse slope (%)	= 1.70		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.10		0.00		0.00		
Travel Time (min)	**= 0.63**	**+**	**0.00**	**+**	**0.00**	**=**	**0.63**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 15.60 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 23

Overland to Basin 3 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 9.283 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 43,827 cuft
Drainage area	= 3.820 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.9 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.220 x 98) + (3.600 x 98)] / 3.820

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	8.489
12.10	9.150
12.13	9.283
<<	
12.17	9.068
12.20	8.682

...End

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 23

Overland to Basin 3 Impervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 60.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 3.00		0.00		0.00		
Travel Time (min)	**= 7.94**	**+**	**0.00**	**+**	**0.00**	**=**	**7.94**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.90 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 24

Composite to Basin 3

Hydrograph type	= Combine	Peak discharge	= 9.713 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 76,399 cuft
Inflow hyds.	= 21, 22, 23	Contrib. drain. area	= 7.340 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 21 + (cfs)	Hyd. 22 + (cfs)	Hyd. 23 = (cfs)	Outflow (cfs)
12.10	0.000	0.323	9.150	9.473
12.13	0.000	0.430	9.283 <<	9.713
<<				
12.17	0.000	0.527	9.068	9.595
12.20	0.000	0.606	8.682	9.288
12.23	0.000	0.669	8.222	8.890

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 25

Rout Basin 3

Hydrograph type	= Reservoir	Peak discharge	= 0.159 cfs
Storm frequency	= 2 yrs	Time to peak	= 29.00 hrs
Time interval	= 2 min	Hyd. volume	= 34,842 cuft
Inflow hyd. No.	= 24 - Composite to Basin 3	Reservoir name	= Basin 3
Max. Elevation	= 130.12 ft	Max. Storage	= 66,368 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
23.00	0.757	130.09	0.143	-----	-----	-----	-----	0.143	-----	-----	-----	0.143
23.03	0.754	130.10	0.143	-----	-----	-----	-----	0.143	-----	-----	-----	0.143
23.07	0.752	130.10	0.144	-----	-----	-----	-----	0.143	-----	-----	-----	0.143
23.10	0.749	130.10	0.144	-----	-----	-----	-----	0.144	-----	-----	-----	0.144
23.13	0.747	130.10	0.144	-----	-----	-----	-----	0.144	-----	-----	-----	0.144
23.17	0.744	130.10	0.144	-----	-----	-----	-----	0.144	-----	-----	-----	0.144
23.20	0.741	130.10	0.144	-----	-----	-----	-----	0.144	-----	-----	-----	0.144
23.23	0.739	130.10	0.145	-----	-----	-----	-----	0.145	-----	-----	-----	0.145
23.27	0.736	130.10	0.145	-----	-----	-----	-----	0.145	-----	-----	-----	0.145
23.30	0.734	130.10	0.145	-----	-----	-----	-----	0.145	-----	-----	-----	0.145
23.33	0.731	130.10	0.145	-----	-----	-----	-----	0.145	-----	-----	-----	0.145
23.37	0.728	130.10	0.146	-----	-----	-----	-----	0.145	-----	-----	-----	0.145
23.40	0.726	130.10	0.146	-----	-----	-----	-----	0.146	-----	-----	-----	0.146
23.43	0.723	130.10	0.146	-----	-----	-----	-----	0.146	-----	-----	-----	0.146
23.47	0.721	130.10	0.146	-----	-----	-----	-----	0.146	-----	-----	-----	0.146
23.50	0.718	130.10	0.146	-----	-----	-----	-----	0.146	-----	-----	-----	0.146
23.53	0.716	130.10	0.147	-----	-----	-----	-----	0.147	-----	-----	-----	0.147
23.57	0.713	130.10	0.147	-----	-----	-----	-----	0.147	-----	-----	-----	0.147
23.60	0.710	130.10	0.147	-----	-----	-----	-----	0.147	-----	-----	-----	0.147
23.63	0.708	130.10	0.148	-----	-----	-----	-----	0.147	-----	-----	-----	0.147

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
23.67	0.705	130.10	0.148	-----	-----	-----	-----	0.148	-----	-----	-----	0.148
23.70	0.703	130.10	0.148	-----	-----	-----	-----	0.148	-----	-----	-----	0.148
23.73	0.700	130.10	0.148	-----	-----	-----	-----	0.148	-----	-----	-----	0.148
23.77	0.698	130.10	0.149	-----	-----	-----	-----	0.149	-----	-----	-----	0.149
23.80	0.695	130.10	0.149	-----	-----	-----	-----	0.149	-----	-----	-----	0.149
23.83	0.692	130.10	0.149	-----	-----	-----	-----	0.149	-----	-----	-----	0.149
23.87	0.690	130.10	0.150	-----	-----	-----	-----	0.149	-----	-----	-----	0.149
23.90	0.687	130.10	0.150	-----	-----	-----	-----	0.150	-----	-----	-----	0.150
23.93	0.685	130.11	0.150	-----	-----	-----	-----	0.150	-----	-----	-----	0.150
23.97	0.682	130.11	0.150	-----	-----	-----	-----	0.150	-----	-----	-----	0.150
24.00	0.680	130.11	0.151	-----	-----	-----	-----	0.150	-----	-----	-----	0.150
24.03	0.671	130.11	0.151	-----	-----	-----	-----	0.150	-----	-----	-----	0.150
24.07	0.656	130.11	0.151	-----	-----	-----	-----	0.151	-----	-----	-----	0.151
24.10	0.635	130.11	0.151	-----	-----	-----	-----	0.151	-----	-----	-----	0.151
24.13	0.614	130.11	0.152	-----	-----	-----	-----	0.151	-----	-----	-----	0.151
24.17	0.593	130.11	0.152	-----	-----	-----	-----	0.151	-----	-----	-----	0.151
24.20	0.572	130.11	0.152	-----	-----	-----	-----	0.152	-----	-----	-----	0.152
24.23	0.553	130.11	0.152	-----	-----	-----	-----	0.152	-----	-----	-----	0.152
24.27	0.534	130.11	0.153	-----	-----	-----	-----	0.152	-----	-----	-----	0.152
24.30	0.516	130.11	0.153	-----	-----	-----	-----	0.152	-----	-----	-----	0.152
24.33	0.499	130.11	0.153	-----	-----	-----	-----	0.152	-----	-----	-----	0.152
24.37	0.484	130.11	0.153	-----	-----	-----	-----	0.152	-----	-----	-----	0.152
24.40	0.470	130.11	0.153	-----	-----	-----	-----	0.153	-----	-----	-----	0.153
24.43	0.457	130.11	0.153	-----	-----	-----	-----	0.153	-----	-----	-----	0.153
24.47	0.446	130.11	0.154	-----	-----	-----	-----	0.153	-----	-----	-----	0.153
24.50	0.435	130.11	0.154	-----	-----	-----	-----	0.153	-----	-----	-----	0.153
24.53	0.424	130.11	0.154	-----	-----	-----	-----	0.153	-----	-----	-----	0.153

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
24.57	0.413	130.11	0.154	-----	-----	-----	-----	0.153	-----	-----	-----	0.153
24.60	0.403	130.11	0.154	-----	-----	-----	-----	0.153	-----	-----	-----	0.153
24.63	0.393	130.11	0.154	-----	-----	-----	-----	0.153	-----	-----	-----	0.153
24.67	0.383	130.11	0.154	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.70	0.374	130.11	0.154	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.73	0.364	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.77	0.356	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.80	0.347	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.83	0.339	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.87	0.335	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.90	0.332	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.93	0.330	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
24.97	0.328	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
25.00	0.326	130.11	0.155	-----	-----	-----	-----	0.154	-----	-----	-----	0.154
25.03	0.324	130.11	0.155	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.07	0.322	130.11	0.155	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.10	0.320	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.13	0.318	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.17	0.316	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.20	0.314	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.23	0.313	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.27	0.311	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.30	0.309	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.33	0.307	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.37	0.305	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.40	0.303	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.43	0.301	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
25.47	0.300	130.11	0.156	-----	-----	-----	-----	0.155	-----	-----	-----	0.155
25.50	0.298	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.53	0.296	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.57	0.294	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.60	0.293	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.63	0.291	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.67	0.289	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.70	0.287	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.73	0.286	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.77	0.284	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.80	0.282	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.83	0.280	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.87	0.279	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.90	0.277	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.93	0.275	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
25.97	0.274	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
26.00	0.272	130.11	0.157	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
26.03	0.270	130.11	0.158	-----	-----	-----	-----	0.156	-----	-----	-----	0.156
26.07	0.269	130.11	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.10	0.267	130.11	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.13	0.266	130.11	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.17	0.264	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.20	0.262	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.23	0.261	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.27	0.259	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.30	0.258	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.33	0.256	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
26.37	0.255	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.40	0.253	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.43	0.252	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.47	0.250	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.50	0.249	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.53	0.247	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.57	0.246	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.60	0.244	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.63	0.243	130.12	0.158	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.67	0.241	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.70	0.240	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.73	0.238	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.77	0.237	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.80	0.235	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
26.83	0.234	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
26.87	0.233	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
26.90	0.231	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
26.93	0.230	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
26.97	0.228	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.00	0.227	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.03	0.226	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.07	0.224	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.10	0.223	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.13	0.222	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.17	0.220	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.20	0.219	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.23	0.218	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
27.27	0.216	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.30	0.215	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.33	0.214	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.37	0.213	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.40	0.211	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.43	0.210	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.47	0.209	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.50	0.207	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.53	0.206	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.57	0.205	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.60	0.204	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.63	0.203	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.67	0.201	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.70	0.200	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.73	0.199	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.77	0.198	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.80	0.197	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.83	0.195	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.87	0.194	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.90	0.193	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.93	0.192	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
27.97	0.191	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.00	0.190	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.03	0.188	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.07	0.187	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.10	0.186	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.13	0.185	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
28.17	0.184	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.20	0.183	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.23	0.182	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.27	0.181	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.30	0.180	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
28.33	0.178	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.158
28.37	0.177	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.40	0.176	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.43	0.175	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.47	0.174	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.50	0.173	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.53	0.172	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.57	0.171	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.60	0.170	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.63	0.169	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.67	0.168	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.70	0.167	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.73	0.166	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.77	0.165	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.80	0.164	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.83	0.163	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.87	0.162	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.90	0.161	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.93	0.160	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
28.97	0.159	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.00	0.158	130.12 <<	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
29.03	0.157	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.07	0.156	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.10	0.155	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.13	0.154	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.17	0.154	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.20	0.153	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.23	0.152	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.27	0.151	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.30	0.150	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.33	0.149	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.37	0.148	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.40	0.147	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.43	0.146	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.47	0.145	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.50	0.145	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.53	0.144	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.57	0.143	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.60	0.142	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.63	0.141	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.159
29.67	0.140	130.12	0.160	-----	-----	-----	-----	0.159	-----	-----	-----	0.158
29.70	0.139	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
29.73	0.139	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
29.77	0.138	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
29.80	0.137	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
29.83	0.136	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
29.87	0.135	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
29.90	0.134	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
29.93	0.134	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
29.97	0.133	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.00	0.132	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.03	0.131	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.07	0.130	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.10	0.130	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.13	0.129	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.17	0.128	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.20	0.127	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.23	0.127	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.27	0.126	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.30	0.125	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.33	0.124	130.12	0.160	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.37	0.124	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.40	0.123	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.43	0.122	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.47	0.121	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.50	0.121	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.53	0.120	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.57	0.119	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.60	0.118	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.63	0.118	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.67	0.117	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.70	0.116	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.73	0.116	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.77	0.115	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.80	0.114	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
30.83	0.114	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.87	0.113	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.90	0.112	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.93	0.112	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
30.97	0.111	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.00	0.110	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.03	0.110	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.07	0.109	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.10	0.108	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.13	0.108	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.17	0.107	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.20	0.106	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.23	0.106	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.27	0.105	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.30	0.104	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.33	0.104	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.37	0.103	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.40	0.103	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.43	0.102	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.47	0.101	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.50	0.101	130.12	0.159	-----	-----	-----	-----	0.158	-----	-----	-----	0.158
31.53	0.100	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
31.57	0.099	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
31.60	0.099	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
31.63	0.098	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
31.67	0.098	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157
31.70	0.097	130.12	0.159	-----	-----	-----	-----	0.157	-----	-----	-----	0.157

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 26

Pre Developed Area A

Hydrograph type	= SCS Runoff	Peak discharge	= 3.386 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.43 hrs
Time interval	= 2 min	Hyd. volume	= 57,052 cuft
Drainage area	= 30.000 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 69.6 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(7.790 x 55) + (10.250 x 58) + (0.680 x 61) + (5.700 x 71) + (5.170 x 70) + (0.410 x 98)] / 30.000

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)	
12.90	3.061	13.47	3.384	14.03	3.172
12.93	3.119	13.50	3.381	14.07	3.150
12.97	3.168	13.53	3.377	14.10	3.127
13.00	3.211	13.57	3.371	14.13	3.104
13.03	3.246	13.60	3.363	14.17	3.079
13.07	3.275	13.63	3.355	14.20	3.053
13.10	3.299	13.67	3.345		
13.13	3.318	13.70	3.335	*...End*	
13.17	3.334	13.73	3.323		
13.20	3.348	13.77	3.310		
13.23	3.359	13.80	3.297		
13.27	3.368	13.83	3.282		
13.30	3.375	13.87	3.266		
13.33	3.380	13.90	3.249		
13.37	3.384	13.93	3.232		
13.40	3.386	13.97	3.213		
13.43	3.386	14.00	3.193		

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TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 26

Pre Developed Area A

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 36.82**	**+**	**0.00**	**+**	**0.00**	**=**	**36.82**
Shallow Concentrated Flow							
Flow length (ft)	= 1055.00		100.00		920.00		
Watercourse slope (%)	= 0.70		2.00		0.25		
Surface description	= Unpaved		Unpaved		Unpaved		
Average velocity (ft/s)	=1.35		2.28		0.81		
Travel Time (min)	**= 13.03**	**+**	**0.73**	**+**	**19.01**	**=**	**32.76**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 69.60 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 27

Pre Development Area B

Hydrograph type	= SCS Runoff	Peak discharge	= 2.871 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.03 hrs
Time interval	= 2 min	Hyd. volume	= 41,975 cuft
Drainage area	= 30.600 ac	Curve number	= 58*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 43.6 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(30.600 x 58)] / 30.600

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)	
12.70	2.641	13.27	2.787
12.73	2.700	13.30	2.764
12.77	2.747	13.33	2.740
12.80	2.785	13.37	2.713
12.83	2.813	13.40	2.684
12.87	2.834	13.43	2.654
12.90	2.849	13.47	2.622
12.93	2.859	13.50	2.588
12.97	2.867		
13.00	2.870	...*End*	
13.03	2.871		
13.07	2.868		
13.10	2.861		
13.13	2.852		
13.17	2.840		
13.20	2.825		
13.23	2.807		

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TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 27

Pre Development Area B

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 27.90**	**+**	**0.00**	**+**	**0.00**	**=**	**27.90**
Shallow Concentrated Flow							
Flow length (ft)	= 1520.00		0.00		0.00		
Watercourse slope (%)	= 1.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.61		0.00		0.00		
Travel Time (min)	**= 15.70**	**+**	**0.00**	**+**	**0.00**	**=**	**15.70**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 43.60 min

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	6.209	2	766	64,792	------	------	------	Pre Development Commercial
2	Reach	0.393	2	1418	58,268	1	------	------	Travel Time Commercial Area
3	SCS Runoff	8.990	2	748	61,784	------	------	------	EW-1 Pervious
4	SCS Runoff	24.93	2	728	119,732	------	------	------	EW-1 Impervious
5	SCS Runoff	2.198	2	740	12,675	------	------	------	Overland Basin 1 Pervious
6	SCS Runoff	0.631	2	728	3,029	------	------	------	Overland Basin 1 Impervious
7	Combine	32.94	2	730	255,488	2, 3, 4, 5, 6	------	------	Composite to Flow Basin 1
8	Reservoir	6.790	2	792	197,888	7	135.44	110,115	Rout Basin 1
9	SCS Runoff	2.604	2	744	16,135	------	------	------	EW-2 Pervious
10	SCS Runoff	13.35	2	728	64,142	------	------	------	EW-2 Impervious
11	SCS Runoff	0.364	2	730	1,741	------	------	------	EW-3 Pervious
12	SCS Runoff	5.005	2	726	20,617	------	------	------	EW-3 Impervious
13	SCS Runoff	3.450	2	748	23,579	------	------	------	EW-4 Pervious
14	SCS Runoff	10.53	2	728	50,601	------	------	------	EW-4 Impervious
15	Combine	32.74	2	728	176,816	9, 10, 11, 12, 13, 14	------	------	Composite Storm Sewer
16	SCS Runoff	2.971	2	744	18,618	------	------	------	Overland to Basin 2 Pervious
17	SCS Runoff	1.214	2	736	7,731	------	------	------	Overland to Basin 2 Impervious
18	SCS Runoff	6.155	2	730	32,644	------	------	------	Route 322 Road Runoff
19	Combine	41.87	2	730	235,808	15, 16, 17, 18	------	------	Composite to Basin 2
20	Reservoir	8.177	2	782	127,632	19	132.17	140,263	Rout Basin 2
21	Reach	8.179	2	782	127,522	20	------	------	Travel Time to Basin 3
22	SCS Runoff	3.045	2	740	17,769	------	------	------	Overland Basin 3 Pervious
23	SCS Runoff	14.17	2	728	68,062	------	------	------	Overland to Basin 3 Impervious
24	Combine	16.52	2	728	213,353	21, 22, 23	------	------	Composite to Basin 3
25	Reservoir	0.731	2	1472	132,048	24	130.74	180,586	Rout Basin 3
26	SCS Runoff	11.36	2	786	156,471	------	------	------	Pre Developed Area A
27	SCS Runoff	12.37	2	766	130,106	------	------	------	Pre Development Area B

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 1

Pre Development Commercial

Hydrograph type	= SCS Runoff	Peak discharge	= 6.209 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.77 hrs
Time interval	= 2 min	Hyd. volume	= 64,792 cuft
Drainage area	= 13.120 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 46.9 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(5.150 x 70) + (7.970 x 55)] / 13.120

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)	
12.53	5.668	13.10	5.765
12.57	5.814	13.13	5.690
12.60	5.936	13.17	5.610
12.63	6.033		
12.67	6.108	*...End*	
12.70	6.161		
12.73	6.194		
12.77	6.209		
<<			
12.80	6.207		
12.83	6.191		
12.87	6.163		
12.90	6.124		
12.93	6.077		
12.97	6.024		
13.00	5.967		
13.03	5.904		
13.07	5.837		

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 2

Travel Time Commercial Area

Hydrograph type	= Reach	Peak discharge	= 0.393 cfs
Storm frequency	= 10 yrs	Time to peak	= 23.63 hrs
Time interval	= 2 min	Hyd. volume	= 58,268 cuft
Inflow hyd. No.	= 1 - Pre Development	Section type	= Circular
Reach length	= 1387.0 ft	Channel slope	= 0.01 %
Manning's n	= 0.013	Pipe diameter	= 30.00 ft
Side slope	= n/a	Max. depth	= n/a
Rating curve x	= 0.809	Rating curve m	= 1.250
Ave. velocity	= 0.01 ft/s	Routing coeff.	= 0.0009

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
16.77	1.003	0.354
16.80	0.994	0.355
16.83	0.985	0.356
16.87	0.977	0.356
16.90	0.968	0.357
16.93	0.960	0.357
16.97	0.951	0.358
17.00	0.943	0.359
17.03	0.935	0.359
17.07	0.928	0.360
17.10	0.920	0.360
17.13	0.912	0.361
17.17	0.905	0.361
17.20	0.898	0.362
17.23	0.891	0.362
17.27	0.884	0.363

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Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
17.30	0.877	0.363
17.33	0.870	0.364
17.37	0.863	0.364
17.40	0.856	0.365
17.43	0.850	0.365
17.47	0.843	0.366
17.50	0.837	0.366
17.53	0.831	0.367
17.57	0.824	0.367
17.60	0.818	0.367
17.63	0.812	0.368
17.67	0.806	0.368
17.70	0.800	0.369
17.73	0.794	0.369
17.77	0.788	0.369
17.80	0.782	0.370
17.83	0.776	0.370
17.87	0.770	0.371
17.90	0.765	0.371
17.93	0.759	0.371
17.97	0.753	0.372
18.00	0.747	0.372
18.03	0.741	0.373
18.07	0.736	0.373
18.10	0.730	0.373
18.13	0.724	0.374

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
18.17	0.719	0.374
18.20	0.713	0.374
18.23	0.707	0.375
18.27	0.702	0.375
18.30	0.696	0.375
18.33	0.691	0.375
18.37	0.686	0.376
18.40	0.681	0.376
18.43	0.676	0.376
18.47	0.671	0.377
18.50	0.666	0.377
18.53	0.661	0.377
18.57	0.657	0.377
18.60	0.652	0.378
18.63	0.648	0.378
18.67	0.644	0.378
18.70	0.640	0.378
18.73	0.636	0.379
18.77	0.632	0.379
18.80	0.628	0.379
18.83	0.625	0.379
18.87	0.621	0.380
18.90	0.618	0.380
18.93	0.614	0.380
18.97	0.611	0.380
19.00	0.608	0.381

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
19.03	0.605	0.381
19.07	0.602	0.381
19.10	0.599	0.381
19.13	0.596	0.381
19.17	0.593	0.382
19.20	0.591	0.382
19.23	0.588	0.382
19.27	0.585	0.382
19.30	0.583	0.382
19.33	0.581	0.383
19.37	0.578	0.383
19.40	0.576	0.383
19.43	0.574	0.383
19.47	0.572	0.383
19.50	0.569	0.384
19.53	0.567	0.384
19.57	0.565	0.384
19.60	0.563	0.384
19.63	0.561	0.384
19.67	0.559	0.384
19.70	0.558	0.385
19.73	0.556	0.385
19.77	0.554	0.385
19.80	0.552	0.385
19.83	0.550	0.385
19.87	0.548	0.385

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
19.90	0.547	0.386
19.93	0.545	0.386
19.97	0.543	0.386
20.00	0.542	0.386
20.03	0.540	0.386
20.07	0.538	0.386
20.10	0.536	0.386
20.13	0.535	0.387
20.17	0.533	0.387
20.20	0.531	0.387
20.23	0.530	0.387
20.27	0.528	0.387
20.30	0.526	0.387
20.33	0.524	0.387
20.37	0.523	0.387
20.40	0.521	0.388
20.43	0.519	0.388
20.47	0.517	0.388
20.50	0.516	0.388
20.53	0.514	0.388
20.57	0.512	0.388
20.60	0.510	0.388
20.63	0.509	0.388
20.67	0.507	0.389
20.70	0.505	0.389
20.73	0.503	0.389

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
20.77	0.502	0.389
20.80	0.500	0.389
20.83	0.498	0.389
20.87	0.496	0.389
20.90	0.495	0.389
20.93	0.493	0.389
20.97	0.491	0.390
21.00	0.489	0.390
21.03	0.488	0.390
21.07	0.486	0.390
21.10	0.484	0.390
21.13	0.482	0.390
21.17	0.481	0.390
21.20	0.479	0.390
21.23	0.477	0.390
21.27	0.475	0.390
21.30	0.473	0.390
21.33	0.472	0.390
21.37	0.470	0.391
21.40	0.468	0.391
21.43	0.466	0.391
21.47	0.464	0.391
21.50	0.463	0.391
21.53	0.461	0.391
21.57	0.459	0.391
21.60	0.457	0.391

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
21.63	0.455	0.391
21.67	0.454	0.391
21.70	0.452	0.391
21.73	0.450	0.391
21.77	0.448	0.391
21.80	0.446	0.391
21.83	0.445	0.391
21.87	0.443	0.392
21.90	0.441	0.392
21.93	0.439	0.392
21.97	0.437	0.392
22.00	0.436	0.392
22.03	0.436	0.392
22.07	0.436	0.392
22.10	0.436	0.392
22.13	0.437	0.392
22.17	0.437	0.392
22.20	0.438	0.392
22.23	0.439	0.392
22.27	0.439	0.392
22.30	0.440	0.392
22.33	0.441	0.392
22.37	0.442	0.392
22.40	0.443	0.392
22.43	0.444	0.392
22.47	0.445	0.392

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
22.50	0.444	0.392
22.53	0.443	0.392
22.57	0.441	0.392
22.60	0.440	0.393
22.63	0.438	0.393
22.67	0.437	0.393
22.70	0.436	0.393
22.73	0.434	0.393
22.77	0.433	0.393
22.80	0.431	0.393
22.83	0.430	0.393
22.87	0.429	0.393
22.90	0.427	0.393
22.93	0.426	0.393
22.97	0.424	0.393
23.00	0.423	0.393
23.03	0.421	0.393
23.07	0.420	0.393
23.10	0.418	0.393
23.13	0.417	0.393
23.17	0.415	0.393
23.20	0.414	0.393
23.23	0.412	0.393
23.27	0.410	0.393
23.30	0.409	0.393
23.33	0.407	0.393

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
23.37	0.406	0.393
23.40	0.404	0.393
23.43	0.402	0.393
23.47	0.401	0.393
23.50	0.399	0.393
23.53	0.397	0.393
23.57	0.396	0.393
23.60	0.394	0.393
23.63	0.392	0.393
23.67	0.391	0.393
23.70	0.389	0.393
23.73	0.387	0.393
23.77	0.385	0.393
23.80	0.384	0.393
23.83	0.382	0.393
23.87	0.380	0.393
23.90	0.378	0.393
23.93	0.376	0.393
23.97	0.374	0.393
24.00	0.372	0.393
24.03	0.370	0.393
24.07	0.366	0.393
24.10	0.362	0.393
24.13	0.358	0.393
24.17	0.352	0.393
24.20	0.347	0.393

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
24.23	0.340	0.393
24.27	0.333	0.393
24.30	0.324	0.393
24.33	0.316	0.393
24.37	0.306	0.393
24.40	0.296	0.393
24.43	0.285	0.393
24.47	0.273	0.392
24.50	0.261	0.392
24.53	0.250	0.392
24.57	0.239	0.392
24.60	0.229	0.392
24.63	0.218	0.392
24.67	0.208	0.392
24.70	0.198	0.391
24.73	0.188	0.391
24.77	0.179	0.391
24.80	0.170	0.391
24.83	0.161	0.391
24.87	0.152	0.390
24.90	0.144	0.390
24.93	0.136	0.390
24.97	0.128	0.390
25.00	0.120	0.389
25.03	0.113	0.389
25.07	0.105	0.389

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
25.10	0.098	0.389
25.13	0.092	0.388
25.17	0.085	0.388
25.20	0.079	0.388
25.23	0.073	0.388
25.27	0.067	0.387
25.30	0.062	0.387
25.33	0.057	0.387
25.37	0.052	0.386
25.40	0.047	0.386
25.43	0.042	0.386
25.47	0.038	0.385
25.50	0.034	0.385
25.53	0.030	0.385
25.57	0.027	0.384
25.60	0.023	0.384
25.63	0.020	0.384
25.67	0.017	0.383
25.70	0.015	0.383
25.73	0.012	0.383
25.77	0.010	0.382
25.80	0.008	0.382
25.83	0.006	0.382
25.87	0.005	0.381
25.90	0.003	0.381
25.93	0.002	0.380

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
25.97	0.001	0.380
26.00	0.001	0.380
26.03	0.000	0.379
26.07	0.000	0.379
26.10	0.000	0.379
26.13	0.000	0.378
26.17	0.000	0.378
26.20	0.000	0.378
26.23	0.000	0.377
26.27	0.000	0.377
26.30	0.000	0.377
26.33	0.000	0.376
26.37	0.000	0.376
26.40	0.000	0.375
26.43	0.000	0.375
26.47	0.000	0.375
26.50	0.000	0.374
26.53	0.000	0.374
26.57	0.000	0.374
26.60	0.000	0.373
26.63	0.000	0.373
26.67	0.000	0.373
26.70	0.000	0.372
26.73	0.000	0.372
26.77	0.000	0.372
26.80	0.000	0.371

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
26.83	0.000	0.371
26.87	0.000	0.370
26.90	0.000	0.370
26.93	0.000	0.370
26.97	0.000	0.369
27.00	0.000	0.369
27.03	0.000	0.369
27.07	0.000	0.368
27.10	0.000	0.368
27.13	0.000	0.368
27.17	0.000	0.367
27.20	0.000	0.367
27.23	0.000	0.367
27.27	0.000	0.366
27.30	0.000	0.366
27.33	0.000	0.366
27.37	0.000	0.365
27.40	0.000	0.365
27.43	0.000	0.365
27.47	0.000	0.364
27.50	0.000	0.364
27.53	0.000	0.364
27.57	0.000	0.363
27.60	0.000	0.363
27.63	0.000	0.362
27.67	0.000	0.362

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
27.70	0.000	0.362
27.73	0.000	0.361
27.77	0.000	0.361
27.80	0.000	0.361
27.83	0.000	0.360
27.87	0.000	0.360
27.90	0.000	0.360
27.93	0.000	0.359
27.97	0.000	0.359
28.00	0.000	0.359
28.03	0.000	0.358
28.07	0.000	0.358
28.10	0.000	0.358
28.13	0.000	0.357
28.17	0.000	0.357
28.20	0.000	0.357
28.23	0.000	0.356
28.27	0.000	0.356
28.30	0.000	0.356
28.33	0.000	0.355
28.37	0.000	0.355
28.40	0.000	0.355
28.43	0.000	0.354
28.47	0.000	0.354

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 3

EW-1 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 8.990 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.47 hrs
Time interval	= 2 min	Hyd. volume	= 61,784 cuft
Drainage area	= 9.500 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.5 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(5.340 x 61) + (4.160 x 74)] / 9.500

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.30	8.306
12.33	8.568
12.37	8.754
12.40	8.887
12.43	8.966
12.47	8.990
<<	
12.50	8.958
12.53	8.874
12.57	8.743
12.60	8.569
12.63	8.360
12.67	8.120

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 4

EW-1 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 24.93 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 119,732 cuft
Drainage area	= 6.720 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.6 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(6.720 x 98)] / 6.720

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	22.82
12.10	24.58
12.13	24.93
<<	
12.17	24.34
12.20	23.30

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 5

Overland Basin 1 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 2.198 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 12,675 cuft
Drainage area	= 2.390 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.4 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.060 x 55) + (2.070 x 61) + (0.260 x 74)] / 2.390

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.20	2.035
12.23	2.113
12.27	2.160
12.30	2.189
12.33	2.198
<<	
12.37	2.188
12.40	2.158
12.43	2.110
12.47	2.042

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 6

Overland Basin 1 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.631 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 3,029 cuft
Drainage area	= 0.170 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.9 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.170 x 98)] / 0.170

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	0.577
12.10	0.622
12.13	0.631
<<	
12.17	0.616
12.20	0.589

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 7

Composite to Flow Basin 1

Hydrograph type	= Combine	Peak discharge	= 32.94 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 255,488 cuft
Inflow hyds.	= 2, 3, 4, 5, 6	Contrib. drain. area	= 18.780 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 2 + (cfs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 = (cfs)	Outflow (cfs)
12.10	0.006	4.625	24.58	1.483	0.622	31.32
12.13	0.007	5.342	24.93 <<	1.722	0.631 <<	32.63
12.17	0.009	6.068	24.34	1.910	0.616	32.94
<<						
12.20	0.011	6.776	23.30	2.035	0.589	32.71
12.23	0.013	7.417	22.05	2.113	0.558	32.16
12.27	0.016	7.933	20.64	2.160	0.522	31.27
12.30	0.019	8.306	19.08	2.189	0.483	30.07

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Tuesday, Mar 24, 2015

Hyd. No. 8

Rout Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 6.790 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.20 hrs
Time interval	= 2 min	Hyd. volume	= 197,888 cuft
Inflow hyd. No.	= 7 - Composite to Flow Basin 1	Reservoir name	= Basin 1
Max. Elevation	= 135.44 ft	Max. Storage	= 110,115 cuft

Storage Indication method used.

(Printed values >= 90.00% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.80	12.04	135.32	6.297	-----	-----	-----	-----	6.171	-----	-----	-----	6.171
12.83	11.46	135.34	6.380	-----	-----	-----	-----	6.288	-----	-----	-----	6.288
12.87	10.93	135.36	6.453	-----	-----	-----	-----	6.390	-----	-----	-----	6.390
12.90	10.44	135.38	6.517	-----	-----	-----	-----	6.480	-----	-----	-----	6.480
12.93	9.965	135.39	6.573	-----	-----	-----	-----	6.558	-----	-----	-----	6.558
12.97	9.502	135.40	6.626	-----	-----	-----	-----	6.623	-----	-----	-----	6.623
13.00	9.042	135.41	6.686	-----	-----	-----	-----	6.673	-----	-----	-----	6.673
13.03	8.591	135.42	6.735	-----	-----	-----	-----	6.713	-----	-----	-----	6.713
13.07	8.154	135.43	6.773	-----	-----	-----	-----	6.745	-----	-----	-----	6.745
13.10	7.735	135.43	6.800	-----	-----	-----	-----	6.767	-----	-----	-----	6.767
13.13	7.343	135.44	6.818	-----	-----	-----	-----	6.782	-----	-----	-----	6.782
13.17	6.986	135.44	6.827	-----	-----	-----	-----	6.789	-----	-----	-----	6.789
13.20	6.675	135.44 <<	6.828	-----	-----	-----	-----	6.790	-----	-----	-----	6.790
13.23	6.412	135.44	6.822	-----	-----	-----	-----	6.785	-----	-----	-----	6.785
13.27	6.188	135.43	6.811	-----	-----	-----	-----	6.776	-----	-----	-----	6.776
13.30	5.992	135.43	6.795	-----	-----	-----	-----	6.763	-----	-----	-----	6.763
13.33	5.818	135.43	6.776	-----	-----	-----	-----	6.747	-----	-----	-----	6.747
13.37	5.663	135.42	6.753	-----	-----	-----	-----	6.728	-----	-----	-----	6.728
13.40	5.525	135.42	6.727	-----	-----	-----	-----	6.706	-----	-----	-----	6.706

Continues on next page...

Rout Basin 1

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.43	5.403	135.42	6.699	-----	-----	-----	-----	6.683	-----	-----	-----	6.683
13.47	5.293	135.41	6.668	-----	-----	-----	-----	6.658	-----	-----	-----	6.658
13.50	5.195	135.40	6.636	-----	-----	-----	-----	6.631	-----	-----	-----	6.631
13.53	5.106	135.40	6.604	-----	-----	-----	-----	6.603	-----	-----	-----	6.603
13.57	5.026	135.39	6.581	-----	-----	-----	-----	6.571	-----	-----	-----	6.571
13.60	4.953	135.39	6.558	-----	-----	-----	-----	6.537	-----	-----	-----	6.537
13.63	4.885	135.38	6.534	-----	-----	-----	-----	6.504	-----	-----	-----	6.504
13.67	4.821	135.37	6.509	-----	-----	-----	-----	6.469	-----	-----	-----	6.469
13.70	4.759	135.37	6.484	-----	-----	-----	-----	6.434	-----	-----	-----	6.434
13.73	4.699	135.36	6.459	-----	-----	-----	-----	6.398	-----	-----	-----	6.398
13.77	4.640	135.35	6.433	-----	-----	-----	-----	6.362	-----	-----	-----	6.362
13.80	4.583	135.35	6.407	-----	-----	-----	-----	6.326	-----	-----	-----	6.326
13.83	4.526	135.34	6.381	-----	-----	-----	-----	6.289	-----	-----	-----	6.289
13.87	4.471	135.33	6.354	-----	-----	-----	-----	6.251	-----	-----	-----	6.251
13.90	4.416	135.33	6.327	-----	-----	-----	-----	6.213	-----	-----	-----	6.213
13.93	4.362	135.32	6.300	-----	-----	-----	-----	6.175	-----	-----	-----	6.175
13.97	4.309	135.31	6.273	-----	-----	-----	-----	6.137	-----	-----	-----	6.137

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 9

EW-2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 2.604 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 16,135 cuft
Drainage area	= 3.110 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.4 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(2.950 x 61) + (0.160 x 74)] / 3.110

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.23	2.373
12.27	2.466
12.30	2.531
12.33	2.576
12.37	2.600
12.40	2.604
<<	
12.43	2.587
12.47	2.549
12.50	2.491
12.53	2.413

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 10

EW-2 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 13.35 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 64,142 cuft
Drainage area	= 3.600 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.3 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.600 x 98)] / 3.600

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	12.23
12.10	13.17
12.13	13.35
<<	
12.17	13.04
12.20	12.48

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 11

EW-3 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.364 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 1,741 cuft
Drainage area	= 0.340 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.5 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.340 x 61)] / 0.340

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.10	0.332
12.13	0.356
12.17	0.364
<<	
12.20	0.364
12.23	0.359
12.27	0.349
12.30	0.335

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 12

EW-3 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 5.005 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 20,617 cuft
Drainage area	= 1.200 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.4 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(1.200 x 98)] / 1.200

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	4.977
12.10	5.005
<<	
12.13	4.694

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 13

EW-4 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 3.450 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.47 hrs
Time interval	= 2 min	Hyd. volume	= 23,579 cuft
Drainage area	= 4.700 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.5 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(4.680 x 61) + (0.020 x 74)] / 4.700

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.30	3.189
12.33	3.289
12.37	3.366
12.40	3.418
12.43	3.447
12.47	3.450
<<	
12.50	3.428
12.53	3.383
12.57	3.316
12.60	3.231
12.63	3.131

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 14

EW-4 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 10.53 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 50,601 cuft
Drainage area	= 2.840 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.1 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(2.840 x 98)] / 2.840

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	9.644
12.10	10.39
12.13	10.53
<<	
12.17	10.29
12.20	9.846

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 15

Composite Storm Sewer

Hydrograph type	= Combine	Peak discharge	= 32.74 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 176,816 cuft
Inflow hyds.	= 9, 10, 11, 12, 13, 14	Contrib. drain. area	= 15.790 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 9 + (cfs)	Hyd. 10 + (cfs)	Hyd. 11 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 14 = (cfs)	Outflow (cfs)
12.07	1.251	12.23	0.286	4.977	1.387	9.644	29.77
12.10	1.520	13.17	0.332	5.005 <<	1.695	10.39	32.11
12.13	1.788	13.35 <<	0.356	4.694	2.015	10.53 <<	32.74
<<							
12.17	2.034	13.04	0.364 <<	4.239	2.333	10.29	32.30
12.20	2.233	12.48	0.364	3.745	2.629	9.846	31.30
12.23	2.373	11.81	0.359	3.243	2.874	9.321	29.98

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 16

Overland to Basin 2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 2.971 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 18,618 cuft
Drainage area	= 3.770 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.9 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.770 x 61)] / 3.770

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.23	2.679
12.27	2.792
12.30	2.871
12.33	2.928
12.37	2.961
12.40	2.971
12.43	2.956
12.47	2.917
12.50	2.854
12.53	2.769

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 17

Overland to Basin 2 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.214 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 7,731 cuft
Drainage area	= 0.450 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.8 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.450 x 98)] / 0.450

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.17	1.131
12.20	1.184
12.23	1.208
12.27	1.214
<<	
12.30	1.207
12.33	1.193
12.37	1.171
12.40	1.142
12.43	1.107

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 18

Route 322 Road Runoff

Hydrograph type	= SCS Runoff	Peak discharge	= 6.155 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 32,644 cuft
Drainage area	= 1.900 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.0 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(1.900 x 98)] / 1.900

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.10	5.720
12.13	6.058
12.17	6.155
<<	
12.20	6.088
12.23	5.932
12.27	5.730

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 19

Composite to Basin 2

Hydrograph type	= Combine	Peak discharge	= 41.87 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 235,808 cuft
Inflow hyds.	= 15, 16, 17, 18	Contrib. drain. area	= 6.120 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 15 + (cfs)	Hyd. 16 + (cfs)	Hyd. 17 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
12.10	32.11	1.688	0.956	5.720	40.47
12.13	32.74 <<	1.997	1.052	6.058	41.85
12.17	32.30	2.282	1.131	6.155 <<	41.87 <<
12.20	31.30	2.514	1.184	6.088	41.08
12.23	29.98	2.679	1.208	5.932	39.80
12.27	28.44	2.792	1.214 <<	5.730	38.17

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Tuesday, Mar 24, 2015

Hyd. No. 20

Rout Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 8.177 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.03 hrs
Time interval	= 2 min	Hyd. volume	= 127,632 cuft
Inflow hyd. No.	= 19 - Composite to Basin 2	Reservoir name	= Basin 2
Max. Elevation	= 132.17 ft	Max. Storage	= 140,263 cuft

Storage Indication method used.

(Printed values >= 90.00% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.80	11.92	132.15	7.590	-----	-----	-----	-----	7.589	-----	-----	-----	7.589
12.83	11.17	132.16	7.775	-----	-----	-----	-----	7.774	-----	-----	-----	7.774
12.87	10.50	132.16	7.918	-----	-----	-----	-----	7.917	-----	-----	-----	7.917
12.90	9.909	132.16	8.024	-----	-----	-----	-----	8.024	-----	-----	-----	8.024
12.93	9.384	132.17	8.100	-----	-----	-----	-----	8.100	-----	-----	-----	8.100
12.97	8.905	132.17	8.149	-----	-----	-----	-----	8.148	-----	-----	-----	8.148
13.00	8.459	132.17	8.174	-----	-----	-----	-----	8.173	-----	-----	-----	8.173
13.03	8.043	132.17 <<	8.178	-----	-----	-----	-----	8.177	-----	-----	-----	8.177
13.07	7.667	132.17	8.162	-----	-----	-----	-----	8.162	-----	-----	-----	8.162
13.10	7.336	132.17	8.132	-----	-----	-----	-----	8.131	-----	-----	-----	8.131
13.13	7.048	132.17	8.088	-----	-----	-----	-----	8.087	-----	-----	-----	8.087
13.17	6.796	132.16	8.034	-----	-----	-----	-----	8.033	-----	-----	-----	8.033
13.20	6.576	132.16	7.971	-----	-----	-----	-----	7.970	-----	-----	-----	7.970
13.23	6.385	132.16	7.901	-----	-----	-----	-----	7.900	-----	-----	-----	7.900
13.27	6.219	132.16	7.826	-----	-----	-----	-----	7.826	-----	-----	-----	7.826
13.30	6.075	132.15	7.748	-----	-----	-----	-----	7.748	-----	-----	-----	7.747
13.33	5.950	132.15	7.667	-----	-----	-----	-----	7.666	-----	-----	-----	7.666
13.37	5.839	132.15	7.584	-----	-----	-----	-----	7.584	-----	-----	-----	7.584
13.40	5.739	132.15	7.501	-----	-----	-----	-----	7.500	-----	-----	-----	7.500

Continues on next page...

Rout Basin 2

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.43	5.647	132.14	7.416	-----	-----	-----	-----	7.415	-----	-----	-----	7.416

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 21

Travel Time to Basin 3

Hydrograph type	= Reach	Peak discharge	= 8.179 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.03 hrs
Time interval	= 2 min	Hyd. volume	= 127,522 cuft
Inflow hyd. No.	= 20 - Rout Basin 2	Section type	= Circular
Reach length	= 63.0 ft	Channel slope	= 13.49 %
Manning's n	= 0.013	Pipe diameter	= 1.50 ft
Side slope	= n/a	Max. depth	= n/a
Rating curve x	= 24.304	Rating curve m	= 1.250
Ave. velocity	= 4.63 ft/s	Routing coeff.	= 1.6927

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
12.80	7.589	7.466
12.83	7.774	7.675
12.87	7.917	7.843
12.90	8.024	7.968
12.93	8.100	8.062
12.97	8.148	8.125
13.00	8.173	8.164
13.03	8.177 <<	8.179
<<		
13.07	8.162	8.175
13.10	8.131	8.153
13.13	8.087	8.116
13.17	8.033	8.067
13.20	7.970	8.009
13.23	7.900	7.943
13.27	7.826	7.871
13.30	7.747	7.794

Continues on next page...

Travel Time to Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
13.33	7.666	7.715
13.37	7.584	7.633
13.40	7.500	7.550
13.43	7.416	7.465
13.47	7.331	7.381

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 22

Overland Basin 3 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 3.045 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 17,769 cuft
Drainage area	= 3.520 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.6 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.520 x 61)] / 3.520

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.20	2.794
12.23	2.908
12.27	2.981
12.30	3.027
12.33	3.045
<<	
12.37	3.037
12.40	3.001
12.43	2.938
12.47	2.848

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 23

Overland to Basin 3 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 14.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 68,062 cuft
Drainage area	= 3.820 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.9 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.220 x 98) + (3.600 x 98)] / 3.820

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	12.97
12.10	13.97
12.13	14.17
<<	
12.17	13.84
12.20	13.24

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 24

Composite to Basin 3

Hydrograph type	= Combine	Peak discharge	= 16.52 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 213,353 cuft
Inflow hyds.	= 21, 22, 23	Contrib. drain. area	= 7.340 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 21 + (cfs)	Hyd. 22 + (cfs)	Hyd. 23 = (cfs)	Outflow (cfs)
12.10	0.000	2.012	13.97	15.98
12.13	0.000	2.347	14.17 <<	16.52
<<				
12.17	0.000	2.614	13.84	16.45
12.20	0.000	2.794	13.24	16.04
12.23	0.000	2.908	12.54	15.45

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 25

Rout Basin 3

Hydrograph type	= Reservoir	Peak discharge	= 0.731 cfs
Storm frequency	= 10 yrs	Time to peak	= 24.53 hrs
Time interval	= 2 min	Hyd. volume	= 132,048 cuft
Inflow hyd. No.	= 24 - Composite to Basin 3	Reservoir name	= Basin 3
Max. Elevation	= 130.74 ft	Max. Storage	= 180,586 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.83	1.833	130.68	0.662	-----	-----	-----	-----	0.658	-----	-----	-----	0.658
19.87	1.826	130.68	0.663	-----	-----	-----	-----	0.659	-----	-----	-----	0.659
19.90	1.818	130.68	0.664	-----	-----	-----	-----	0.660	-----	-----	-----	0.660
19.93	1.811	130.68	0.665	-----	-----	-----	-----	0.661	-----	-----	-----	0.661
19.97	1.803	130.68	0.666	-----	-----	-----	-----	0.662	-----	-----	-----	0.662
20.00	1.796	130.68	0.666	-----	-----	-----	-----	0.662	-----	-----	-----	0.662
20.03	1.788	130.68	0.667	-----	-----	-----	-----	0.663	-----	-----	-----	0.663
20.07	1.781	130.68	0.668	-----	-----	-----	-----	0.664	-----	-----	-----	0.664
20.10	1.774	130.68	0.669	-----	-----	-----	-----	0.665	-----	-----	-----	0.665
20.13	1.767	130.68	0.669	-----	-----	-----	-----	0.665	-----	-----	-----	0.665
20.17	1.759	130.68	0.670	-----	-----	-----	-----	0.666	-----	-----	-----	0.666
20.20	1.752	130.68	0.671	-----	-----	-----	-----	0.667	-----	-----	-----	0.667
20.23	1.745	130.69	0.672	-----	-----	-----	-----	0.668	-----	-----	-----	0.668
20.27	1.738	130.69	0.672	-----	-----	-----	-----	0.668	-----	-----	-----	0.668
20.30	1.731	130.69	0.673	-----	-----	-----	-----	0.669	-----	-----	-----	0.669
20.33	1.724	130.69	0.674	-----	-----	-----	-----	0.670	-----	-----	-----	0.670
20.37	1.717	130.69	0.674	-----	-----	-----	-----	0.671	-----	-----	-----	0.671
20.40	1.710	130.69	0.675	-----	-----	-----	-----	0.671	-----	-----	-----	0.671
20.43	1.703	130.69	0.676	-----	-----	-----	-----	0.672	-----	-----	-----	0.672
20.47	1.696	130.69	0.677	-----	-----	-----	-----	0.673	-----	-----	-----	0.673

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
20.50	1.689	130.69	0.677	-----	-----	-----	-----	0.674	-----	-----	-----	0.674
20.53	1.683	130.69	0.678	-----	-----	-----	-----	0.674	-----	-----	-----	0.674
20.57	1.676	130.69	0.679	-----	-----	-----	-----	0.675	-----	-----	-----	0.675
20.60	1.669	130.69	0.679	-----	-----	-----	-----	0.676	-----	-----	-----	0.676
20.63	1.662	130.69	0.680	-----	-----	-----	-----	0.676	-----	-----	-----	0.676
20.67	1.656	130.69	0.681	-----	-----	-----	-----	0.677	-----	-----	-----	0.677
20.70	1.649	130.69	0.681	-----	-----	-----	-----	0.678	-----	-----	-----	0.678
20.73	1.642	130.70	0.682	-----	-----	-----	-----	0.678	-----	-----	-----	0.678
20.77	1.636	130.70	0.683	-----	-----	-----	-----	0.679	-----	-----	-----	0.679
20.80	1.629	130.70	0.683	-----	-----	-----	-----	0.680	-----	-----	-----	0.680
20.83	1.622	130.70	0.684	-----	-----	-----	-----	0.680	-----	-----	-----	0.680
20.87	1.616	130.70	0.685	-----	-----	-----	-----	0.681	-----	-----	-----	0.681
20.90	1.609	130.70	0.685	-----	-----	-----	-----	0.682	-----	-----	-----	0.682
20.93	1.603	130.70	0.686	-----	-----	-----	-----	0.682	-----	-----	-----	0.682
20.97	1.596	130.70	0.687	-----	-----	-----	-----	0.683	-----	-----	-----	0.683
21.00	1.590	130.70	0.687	-----	-----	-----	-----	0.684	-----	-----	-----	0.684
21.03	1.583	130.70	0.688	-----	-----	-----	-----	0.684	-----	-----	-----	0.684
21.07	1.577	130.70	0.689	-----	-----	-----	-----	0.685	-----	-----	-----	0.685
21.10	1.570	130.70	0.689	-----	-----	-----	-----	0.686	-----	-----	-----	0.686
21.13	1.564	130.70	0.690	-----	-----	-----	-----	0.686	-----	-----	-----	0.686
21.17	1.558	130.70	0.690	-----	-----	-----	-----	0.687	-----	-----	-----	0.687
21.20	1.551	130.70	0.691	-----	-----	-----	-----	0.688	-----	-----	-----	0.688
21.23	1.545	130.70	0.692	-----	-----	-----	-----	0.688	-----	-----	-----	0.688
21.27	1.538	130.70	0.692	-----	-----	-----	-----	0.689	-----	-----	-----	0.689
21.30	1.532	130.71	0.693	-----	-----	-----	-----	0.690	-----	-----	-----	0.690
21.33	1.526	130.71	0.694	-----	-----	-----	-----	0.690	-----	-----	-----	0.690
21.37	1.519	130.71	0.694	-----	-----	-----	-----	0.691	-----	-----	-----	0.691

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
21.40	1.513	130.71	0.695	-----	-----	-----	-----	0.691	-----	-----	-----	0.691
21.43	1.507	130.71	0.695	-----	-----	-----	-----	0.692	-----	-----	-----	0.692
21.47	1.501	130.71	0.696	-----	-----	-----	-----	0.693	-----	-----	-----	0.693
21.50	1.494	130.71	0.697	-----	-----	-----	-----	0.693	-----	-----	-----	0.693
21.53	1.488	130.71	0.697	-----	-----	-----	-----	0.694	-----	-----	-----	0.694
21.57	1.482	130.71	0.698	-----	-----	-----	-----	0.694	-----	-----	-----	0.694
21.60	1.476	130.71	0.698	-----	-----	-----	-----	0.695	-----	-----	-----	0.695
21.63	1.470	130.71	0.699	-----	-----	-----	-----	0.695	-----	-----	-----	0.695
21.67	1.463	130.71	0.699	-----	-----	-----	-----	0.696	-----	-----	-----	0.696
21.70	1.457	130.71	0.700	-----	-----	-----	-----	0.697	-----	-----	-----	0.697
21.73	1.451	130.71	0.701	-----	-----	-----	-----	0.697	-----	-----	-----	0.697
21.77	1.445	130.71	0.701	-----	-----	-----	-----	0.698	-----	-----	-----	0.698
21.80	1.439	130.71	0.702	-----	-----	-----	-----	0.698	-----	-----	-----	0.698
21.83	1.433	130.71	0.702	-----	-----	-----	-----	0.699	-----	-----	-----	0.699
21.87	1.426	130.71	0.703	-----	-----	-----	-----	0.699	-----	-----	-----	0.699
21.90	1.420	130.71	0.703	-----	-----	-----	-----	0.700	-----	-----	-----	0.700
21.93	1.414	130.71	0.704	-----	-----	-----	-----	0.700	-----	-----	-----	0.700
21.97	1.408	130.72	0.704	-----	-----	-----	-----	0.701	-----	-----	-----	0.701
22.00	1.402	130.72	0.705	-----	-----	-----	-----	0.701	-----	-----	-----	0.701
22.03	1.422	130.72	0.705	-----	-----	-----	-----	0.702	-----	-----	-----	0.702
22.07	1.445	130.72	0.706	-----	-----	-----	-----	0.703	-----	-----	-----	0.703
22.10	1.470	130.72	0.706	-----	-----	-----	-----	0.703	-----	-----	-----	0.703
22.13	1.470	130.72	0.707	-----	-----	-----	-----	0.704	-----	-----	-----	0.704
22.17	1.469	130.72	0.708	-----	-----	-----	-----	0.704	-----	-----	-----	0.704
22.20	1.463	130.72	0.708	-----	-----	-----	-----	0.705	-----	-----	-----	0.705
22.23	1.457	130.72	0.709	-----	-----	-----	-----	0.705	-----	-----	-----	0.705
22.27	1.450	130.72	0.709	-----	-----	-----	-----	0.706	-----	-----	-----	0.706

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
22.30	1.443	130.72	0.710	-----	-----	-----	-----	0.706	-----	-----	-----	0.706
22.33	1.435	130.72	0.710	-----	-----	-----	-----	0.707	-----	-----	-----	0.707
22.37	1.426	130.72	0.711	-----	-----	-----	-----	0.707	-----	-----	-----	0.708
22.40	1.417	130.72	0.711	-----	-----	-----	-----	0.708	-----	-----	-----	0.708
22.43	1.408	130.72	0.712	-----	-----	-----	-----	0.709	-----	-----	-----	0.709
22.47	1.397	130.72	0.712	-----	-----	-----	-----	0.709	-----	-----	-----	0.709
22.50	1.392	130.72	0.713	-----	-----	-----	-----	0.710	-----	-----	-----	0.710
22.53	1.387	130.72	0.713	-----	-----	-----	-----	0.710	-----	-----	-----	0.710
22.57	1.382	130.72	0.714	-----	-----	-----	-----	0.711	-----	-----	-----	0.711
22.60	1.377	130.72	0.714	-----	-----	-----	-----	0.711	-----	-----	-----	0.711
22.63	1.372	130.72	0.715	-----	-----	-----	-----	0.712	-----	-----	-----	0.712
22.67	1.366	130.73	0.715	-----	-----	-----	-----	0.712	-----	-----	-----	0.712
22.70	1.361	130.73	0.716	-----	-----	-----	-----	0.713	-----	-----	-----	0.713
22.73	1.355	130.73	0.716	-----	-----	-----	-----	0.713	-----	-----	-----	0.713
22.77	1.349	130.73	0.717	-----	-----	-----	-----	0.713	-----	-----	-----	0.713
22.80	1.345	130.73	0.717	-----	-----	-----	-----	0.714	-----	-----	-----	0.714
22.83	1.340	130.73	0.718	-----	-----	-----	-----	0.714	-----	-----	-----	0.714
22.87	1.335	130.73	0.718	-----	-----	-----	-----	0.715	-----	-----	-----	0.715
22.90	1.331	130.73	0.719	-----	-----	-----	-----	0.715	-----	-----	-----	0.715
22.93	1.326	130.73	0.719	-----	-----	-----	-----	0.716	-----	-----	-----	0.716
22.97	1.321	130.73	0.719	-----	-----	-----	-----	0.716	-----	-----	-----	0.716
23.00	1.316	130.73	0.720	-----	-----	-----	-----	0.717	-----	-----	-----	0.717
23.03	1.311	130.73	0.720	-----	-----	-----	-----	0.717	-----	-----	-----	0.717
23.07	1.307	130.73	0.721	-----	-----	-----	-----	0.718	-----	-----	-----	0.718
23.10	1.302	130.73	0.721	-----	-----	-----	-----	0.718	-----	-----	-----	0.718
23.13	1.297	130.73	0.722	-----	-----	-----	-----	0.718	-----	-----	-----	0.718
23.17	1.292	130.73	0.722	-----	-----	-----	-----	0.719	-----	-----	-----	0.719

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
23.20	1.287	130.73	0.722	-----	-----	-----	-----	0.719	-----	-----	-----	0.719
23.23	1.283	130.73	0.723	-----	-----	-----	-----	0.720	-----	-----	-----	0.720
23.27	1.278	130.73	0.723	-----	-----	-----	-----	0.720	-----	-----	-----	0.720
23.30	1.273	130.73	0.724	-----	-----	-----	-----	0.720	-----	-----	-----	0.720
23.33	1.268	130.73	0.724	-----	-----	-----	-----	0.721	-----	-----	-----	0.721
23.37	1.264	130.73	0.724	-----	-----	-----	-----	0.721	-----	-----	-----	0.721
23.40	1.259	130.73	0.725	-----	-----	-----	-----	0.722	-----	-----	-----	0.722
23.43	1.254	130.73	0.725	-----	-----	-----	-----	0.722	-----	-----	-----	0.722
23.47	1.249	130.73	0.726	-----	-----	-----	-----	0.722	-----	-----	-----	0.722
23.50	1.245	130.73	0.726	-----	-----	-----	-----	0.723	-----	-----	-----	0.723
23.53	1.240	130.74	0.726	-----	-----	-----	-----	0.723	-----	-----	-----	0.723
23.57	1.235	130.74	0.727	-----	-----	-----	-----	0.724	-----	-----	-----	0.724
23.60	1.231	130.74	0.727	-----	-----	-----	-----	0.724	-----	-----	-----	0.724
23.63	1.226	130.74	0.728	-----	-----	-----	-----	0.724	-----	-----	-----	0.724
23.67	1.221	130.74	0.728	-----	-----	-----	-----	0.725	-----	-----	-----	0.725
23.70	1.217	130.74	0.728	-----	-----	-----	-----	0.725	-----	-----	-----	0.725
23.73	1.212	130.74	0.729	-----	-----	-----	-----	0.725	-----	-----	-----	0.725
23.77	1.207	130.74	0.729	-----	-----	-----	-----	0.726	-----	-----	-----	0.726
23.80	1.203	130.74	0.729	-----	-----	-----	-----	0.726	-----	-----	-----	0.726
23.83	1.198	130.74	0.730	-----	-----	-----	-----	0.727	-----	-----	-----	0.727
23.87	1.194	130.74	0.730	-----	-----	-----	-----	0.727	-----	-----	-----	0.727
23.90	1.189	130.74	0.730	-----	-----	-----	-----	0.727	-----	-----	-----	0.727
23.93	1.184	130.74	0.731	-----	-----	-----	-----	0.728	-----	-----	-----	0.728
23.97	1.180	130.74	0.731	-----	-----	-----	-----	0.728	-----	-----	-----	0.728
24.00	1.175	130.74	0.731	-----	-----	-----	-----	0.728	-----	-----	-----	0.728
24.03	1.161	130.74	0.732	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
24.07	1.137	130.74	0.732	-----	-----	-----	-----	0.729	-----	-----	-----	0.729

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Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
24.10	1.102	130.74	0.732	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
24.13	1.066	130.74	0.733	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
24.17	1.029	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.20	0.993	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.23	0.959	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.27	0.926	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.30	0.895	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.33	0.866	130.74	0.734	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.37	0.839	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.40	0.814	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.43	0.791	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.47	0.771	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.50	0.751	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.53	0.732	130.74 <<	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
<<												
24.57	0.713	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.60	0.695	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.63	0.677	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.67	0.660	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.70	0.644	130.74	0.734	-----	-----	-----	-----	0.731	-----	-----	-----	0.731
24.73	0.628	130.74	0.734	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.77	0.613	130.74	0.734	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.80	0.598	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.83	0.583	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.87	0.569	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.90	0.555	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
24.93	0.541	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
24.97	0.527	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
25.00	0.514	130.74	0.733	-----	-----	-----	-----	0.730	-----	-----	-----	0.730
25.03	0.501	130.74	0.733	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
25.07	0.489	130.74	0.732	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
25.10	0.477	130.74	0.732	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
25.13	0.465	130.74	0.732	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
25.17	0.453	130.74	0.732	-----	-----	-----	-----	0.729	-----	-----	-----	0.729
25.20	0.442	130.74	0.732	-----	-----	-----	-----	0.728	-----	-----	-----	0.728
25.23	0.431	130.74	0.731	-----	-----	-----	-----	0.728	-----	-----	-----	0.728
25.27	0.420	130.74	0.731	-----	-----	-----	-----	0.728	-----	-----	-----	0.728
25.30	0.409	130.74	0.731	-----	-----	-----	-----	0.728	-----	-----	-----	0.728
25.33	0.399	130.74	0.731	-----	-----	-----	-----	0.727	-----	-----	-----	0.727
25.37	0.389	130.74	0.730	-----	-----	-----	-----	0.727	-----	-----	-----	0.727
25.40	0.380	130.74	0.730	-----	-----	-----	-----	0.727	-----	-----	-----	0.727
25.43	0.370	130.74	0.730	-----	-----	-----	-----	0.727	-----	-----	-----	0.727
25.47	0.361	130.74	0.730	-----	-----	-----	-----	0.726	-----	-----	-----	0.726
25.50	0.352	130.74	0.729	-----	-----	-----	-----	0.726	-----	-----	-----	0.726
25.53	0.343	130.74	0.729	-----	-----	-----	-----	0.726	-----	-----	-----	0.726
25.57	0.334	130.74	0.729	-----	-----	-----	-----	0.726	-----	-----	-----	0.726
25.60	0.333	130.74	0.729	-----	-----	-----	-----	0.725	-----	-----	-----	0.725
25.63	0.331	130.74	0.728	-----	-----	-----	-----	0.725	-----	-----	-----	0.725
25.67	0.329	130.74	0.728	-----	-----	-----	-----	0.725	-----	-----	-----	0.725
25.70	0.327	130.74	0.728	-----	-----	-----	-----	0.724	-----	-----	-----	0.724
25.73	0.325	130.74	0.727	-----	-----	-----	-----	0.724	-----	-----	-----	0.724
25.77	0.323	130.74	0.727	-----	-----	-----	-----	0.724	-----	-----	-----	0.724
25.80	0.321	130.74	0.727	-----	-----	-----	-----	0.724	-----	-----	-----	0.724
25.83	0.319	130.74	0.726	-----	-----	-----	-----	0.723	-----	-----	-----	0.723

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 26

Pre Developed Area A

Hydrograph type	= SCS Runoff	Peak discharge	= 11.36 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.10 hrs
Time interval	= 2 min	Hyd. volume	= 156,471 cuft
Drainage area	= 30.000 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 69.6 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(7.790 x 55) + (10.250 x 58) + (0.680 x 61) + (5.700 x 71) + (5.170 x 70) + (0.410 x 98)] / 30.000

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)	
12.77	10.41	13.33	11.17
12.80	10.62	13.37	11.13
12.83	10.79	13.40	11.07
12.87	10.94	13.43	11.02
12.90	11.06	13.47	10.95
12.93	11.16	13.50	10.89
12.97	11.24	13.53	10.82
13.00	11.30	13.57	10.75
13.03	11.33	13.60	10.67
13.07	11.35	13.63	10.59
13.10	11.36	13.67	10.51
13.13	11.35	13.70	10.43
13.17	11.34	13.73	10.34
13.20	11.32	13.77	10.25
13.23	11.29	...End	
13.27	11.26		
13.30	11.22		

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 27

Pre Development Area B

Hydrograph type	= SCS Runoff	Peak discharge	= 12.37 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.77 hrs
Time interval	= 2 min	Hyd. volume	= 130,106 cuft
Drainage area	= 30.600 ac	Curve number	= 58*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 43.6 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(30.600 x 58)] / 30.600

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)	Time -- (hrs	Outflow cfs)
12.53	11.33	13.10	11.39
12.57	11.62	13.13	11.22
12.60	11.87	...End	
12.63	12.06		
12.67	12.20		
12.70	12.29		
12.73	12.35		
12.77	12.37		
<<			
12.80	12.35		
12.83	12.31		
12.87	12.24		
12.90	12.15		
12.93	12.05		
12.97	11.94		
13.00	11.82		
13.03	11.68		
13.07	11.54		

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	19.29	2	762	181,262	------	------	------	Pre Development Commercial
2	Reach	2.689	2	976	180,856	1	------	------	Travel Time Commercial Area
3	SCS Runoff	23.53	2	746	155,558	------	------	------	EW-1 Pervious
4	SCS Runoff	42.55	2	728	207,629	------	------	------	EW-1 Impervious
5	SCS Runoff	6.494	2	736	34,790	------	------	------	Overland Basin 1 Pervious
6	SCS Runoff	1.076	2	728	5,253	------	------	------	Overland Basin 1 Impervious
7	Combine	66.64	2	732	584,086	2, 3, 4, 5, 6	------	------	Composite to Flow Basin 1
8	Reservoir	21.76	2	778	527,987	7	138.05	198,363	Rout Basin 1
9	SCS Runoff	7.686	2	740	44,286	------	------	------	EW-2 Pervious
10	SCS Runoff	22.80	2	728	111,230	------	------	------	EW-2 Impervious
11	SCS Runoff	1.120	2	728	4,871	------	------	------	EW-3 Pervious
12	SCS Runoff	8.540	2	726	35,753	------	------	------	EW-3 Impervious
13	SCS Runoff	10.49	2	744	65,964	------	------	------	EW-4 Pervious
14	SCS Runoff	17.98	2	728	87,748	------	------	------	EW-4 Impervious
15	Combine	63.29	2	728	349,853	9, 10, 11, 12, 13, 14	------	------	Composite Storm Sewer
16	SCS Runoff	9.017	2	740	52,085	------	------	------	Overland to Basin 2 Pervious
17	SCS Runoff	2.072	2	736	13,407	------	------	------	Overland to Basin 2 Impervious
18	SCS Runoff	10.51	2	730	56,608	------	------	------	Route 322 Road Runoff
19	Combine	83.26	2	730	471,953	15, 16, 17, 18	------	------	Composite to Basin 2
20	Reservoir	56.83	2	748	363,776	19	132.98	197,805	Rout Basin 2
21	Reach	59.47	2	748	363,691	20	------	------	Travel Time to Basin 3
22	SCS Runoff	9.253	2	736	49,712	------	------	------	Overland Basin 3 Pervious
23	SCS Runoff	24.19	2	728	118,027	------	------	------	Overland to Basin 3 Impervious
24	Combine	78.82	2	744	531,430	21, 22, 23	------	------	Composite to Basin 3
25	Reservoir	2.537	2	1358	397,424	24	132.04	424,336	Rout Basin 3
26	SCS Runoff	34.58	2	780	429,461	------	------	------	Pre Developed Area A
27	SCS Runoff	42.47	2	760	387,286	------	------	------	Pre Development Area B

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 1

Pre Development Commercial

Hydrograph type	= SCS Runoff	Peak discharge	= 19.29 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.70 hrs
Time interval	= 2 min	Hyd. volume	= 181,262 cuft
Drainage area	= 13.120 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 46.9 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(5.150 x 70) + (7.970 x 55)] / 13.120

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)	
12.47	17.70	13.03	17.46
12.50	18.21	...End	
12.53	18.58		
12.57	18.85		
12.60	19.05		
12.63	19.19		
12.67	19.27		
12.70	19.29		
12.73	19.26		
12.77	19.18		
12.80	19.06		
12.83	18.90		
12.87	18.71		
12.90	18.49		
12.93	18.25		
12.97	18.00		
13.00	17.74		

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 2

Travel Time Commercial Area

Hydrograph type	= Reach	Peak discharge	= 2.689 cfs
Storm frequency	= 100 yrs	Time to peak	= 16.27 hrs
Time interval	= 2 min	Hyd. volume	= 180,856 cuft
Inflow hyd. No.	= 1 - Pre Development Commercial	Section type	= Circular
Reach length	= 1387.0 ft	Channel slope	= 0.01 %
Manning's n	= 0.013	Pipe diameter	= 30.00 ft
Side slope	= n/a	Max. depth	= n/a
Rating curve x	= 0.809	Rating curve m	= 1.250
Ave. velocity	= 0.03 ft/s	Routing coeff.	= 0.0029

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
14.07	6.531	2.432
14.10	6.264	2.444
14.13	6.036	2.455
14.17	5.837	2.466
14.20	5.660	2.476
14.23	5.499	2.485
14.27	5.352	2.494
14.30	5.219	2.503
14.33	5.099	2.511
14.37	4.991	2.518
14.40	4.894	2.525
14.43	4.806	2.532
14.47	4.726	2.539
14.50	4.654	2.546
14.53	4.587	2.552
14.57	4.525	2.558

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Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
14.60	4.466	2.564
14.63	4.409	2.569
14.67	4.354	2.575
14.70	4.302	2.580
14.73	4.251	2.585
14.77	4.202	2.590
14.80	4.155	2.595
14.83	4.110	2.599
14.87	4.066	2.604
14.90	4.024	2.608
14.93	3.982	2.612
14.97	3.942	2.616
15.00	3.903	2.620
15.03	3.865	2.624
15.07	3.827	2.628
15.10	3.790	2.631
15.13	3.753	2.634
15.17	3.717	2.638
15.20	3.682	2.641
15.23	3.647	2.644
15.27	3.612	2.647
15.30	3.578	2.650
15.33	3.544	2.653
15.37	3.511	2.655
15.40	3.477	2.658
15.43	3.445	2.660

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Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
15.47	3.412	2.662
15.50	3.380	2.665
15.53	3.348	2.667
15.57	3.317	2.669
15.60	3.286	2.671
15.63	3.255	2.672
15.67	3.224	2.674
15.70	3.193	2.676
15.73	3.163	2.677
15.77	3.132	2.679
15.80	3.102	2.680
15.83	3.072	2.681
15.87	3.042	2.682
15.90	3.012	2.684
15.93	2.983	2.685
15.97	2.953	2.685
16.00	2.923	2.686
16.03	2.893	2.687
16.07	2.864	2.687
16.10	2.834	2.688
16.13	2.804	2.688
16.17	2.775	2.689
16.20	2.746	2.689
16.23	2.717	2.689
16.27	2.688	2.689
<<		
16.30	2.659	2.689

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Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
16.33	2.631	2.689
16.37	2.603	2.689
16.40	2.576	2.689
16.43	2.549	2.688
16.47	2.523	2.688
16.50	2.497	2.688
16.53	2.471	2.687
16.57	2.446	2.686
16.60	2.422	2.686
16.63	2.398	2.685
16.67	2.375	2.684
16.70	2.352	2.683
16.73	2.329	2.682
16.77	2.307	2.681
16.80	2.286	2.680
16.83	2.264	2.679
16.87	2.243	2.678
16.90	2.223	2.676
16.93	2.203	2.675
16.97	2.183	2.674
17.00	2.164	2.672
17.03	2.145	2.671
17.07	2.126	2.669
17.10	2.108	2.667
17.13	2.090	2.666
17.17	2.072	2.664

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
17.20	2.055	2.662
17.23	2.038	2.661
17.27	2.021	2.659
17.30	2.005	2.657
17.33	1.988	2.655
17.37	1.972	2.653
17.40	1.957	2.651
17.43	1.941	2.649
17.47	1.926	2.647
17.50	1.910	2.645
17.53	1.895	2.643
17.57	1.881	2.640
17.60	1.866	2.638
17.63	1.851	2.636
17.67	1.837	2.634
17.70	1.823	2.631
17.73	1.809	2.629
17.77	1.795	2.626
17.80	1.781	2.624
17.83	1.767	2.621
17.87	1.753	2.619
17.90	1.740	2.616
17.93	1.726	2.614
17.97	1.712	2.611
18.00	1.699	2.609
18.03	1.685	2.606

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
18.07	1.672	2.603
18.10	1.658	2.600
18.13	1.645	2.598
18.17	1.632	2.595
18.20	1.618	2.592
18.23	1.605	2.589
18.27	1.592	2.586
18.30	1.580	2.583
18.33	1.567	2.580
18.37	1.555	2.577
18.40	1.543	2.574
18.43	1.531	2.571
18.47	1.520	2.568
18.50	1.508	2.565
18.53	1.498	2.562
18.57	1.487	2.559
18.60	1.477	2.556
18.63	1.467	2.553
18.67	1.457	2.549
18.70	1.447	2.546
18.73	1.438	2.543
18.77	1.429	2.540
18.80	1.420	2.536
18.83	1.412	2.533
18.87	1.404	2.530
18.90	1.395	2.526

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
18.93	1.388	2.523
18.97	1.380	2.520
19.00	1.373	2.516
19.03	1.365	2.513
19.07	1.358	2.510
19.10	1.352	2.506
19.13	1.345	2.503
19.17	1.339	2.499
19.20	1.332	2.496
19.23	1.326	2.493
19.27	1.320	2.489
19.30	1.314	2.486
19.33	1.309	2.482
19.37	1.303	2.479
19.40	1.298	2.475
19.43	1.293	2.472
19.47	1.287	2.468
19.50	1.282	2.465
19.53	1.277	2.461
19.57	1.273	2.458
19.60	1.268	2.454
19.63	1.263	2.451
19.67	1.259	2.447
19.70	1.254	2.444
19.73	1.250	2.440
19.77	1.246	2.437

Continues on next page...

Travel Time Commercial Area

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Outflow cfs
19.80	1.241	2.433
19.83	1.237	2.430
19.87	1.233	2.426
19.90	1.229	2.423

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 3

EW-1 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 23.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.43 hrs
Time interval	= 2 min	Hyd. volume	= 155,558 cuft
Drainage area	= 9.500 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.5 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(5.340 x 61) + (4.160 x 74)] / 9.500

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.27	21.86
12.30	22.61
12.33	23.08
12.37	23.36
12.40	23.51
12.43	23.53
<<	
12.47	23.41
12.50	23.17
12.53	22.80
12.57	22.33
12.60	21.76

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 4

EW-1 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 42.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 207,629 cuft
Drainage area	= 6.720 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.6 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(6.720 x 98)] / 6.720

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	38.98
12.10	41.97
12.13	42.55
<<	
12.17	41.54
12.20	39.75

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 5

Overland Basin 1 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 6.494 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 34,790 cuft
Drainage area	= 2.390 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.4 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.060 x 55) + (2.070 x 61) + (0.260 x 74)] / 2.390

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.17	6.080
12.20	6.339
12.23	6.459
12.27	6.494
<<	
12.30	6.478
12.33	6.410
12.37	6.292
12.40	6.126
12.43	5.914

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 6

Overland Basin 1 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.076 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 5,253 cuft
Drainage area	= 0.170 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.9 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.170 x 98)] / 0.170

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	0.986
12.10	1.062
12.13	1.076
<<	
12.17	1.051
12.20	1.006

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 7

Composite to Flow Basin 1

Hydrograph type	= Combine	Peak discharge	= 66.64 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.20 hrs
Time interval	= 2 min	Hyd. volume	= 584,086 cuft
Inflow hyds.	= 2, 3, 4, 5, 6	Contrib. drain. area	= 18.780 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 2 + (cfs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 = (cfs)	Outflow (cfs)
12.10	0.226	14.00	41.97	5.015	1.062	62.28
12.13	0.247	15.79	42.55 <<	5.632	1.076 <<	65.29
12.17	0.271	17.56	41.54	6.080	1.051	66.50
12.20	0.297	19.25	39.75	6.339	1.006	66.64
<<						
12.23	0.326	20.73	37.62	6.459	0.952	66.09
12.27	0.358	21.86	35.20	6.494 <<	0.891	64.81
12.30	0.393	22.61	32.53	6.478	0.823	62.84
12.33	0.431	23.08	29.66	6.410	0.750	60.33

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Tuesday, Mar 24, 2015

Hyd. No. 8

Rout Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 21.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.97 hrs
Time interval	= 2 min	Hyd. volume	= 527,987 cuft
Inflow hyd. No.	= 7 - Composite to Flow Basin 1	Reservoir name	= Basin 1
Max. Elevation	= 138.05 ft	Max. Storage	= 198,363 cuft

Storage Indication method used.

(Printed values >= 90.00% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.67	34.25	137.87	19.66	-----	-----	-----	-----	19.66	-----	-----	-----	19.66
12.70	32.34	137.91	19.96	-----	-----	-----	-----	19.96	-----	-----	-----	19.96
12.73	30.57	137.95	20.39	-----	-----	-----	-----	20.38	-----	-----	-----	20.38
12.77	28.96	137.98	20.73	-----	-----	-----	-----	20.73	-----	-----	-----	20.73
12.80	27.51	138.01	21.04	-----	-----	-----	0.041	20.99	-----	-----	-----	21.04
12.83	26.18	138.02	21.32	-----	-----	-----	0.139	21.18	-----	-----	-----	21.32
12.87	24.95	138.04	21.53	-----	-----	-----	0.210	21.32	-----	-----	-----	21.53
12.90	23.78	138.05	21.67	-----	-----	-----	0.258	21.41	-----	-----	-----	21.67
12.93	22.66	138.05	21.75	-----	-----	-----	0.284	21.46	-----	-----	-----	21.74
12.97	21.57	138.05 <<	21.77	-----	-----	-----	0.290	21.47	-----	-----	-----	21.76
<<												
13.00	20.50	138.05	21.73	-----	-----	-----	0.278	21.45	-----	-----	-----	21.73
13.03	19.46	138.04	21.64	-----	-----	-----	0.249	21.39	-----	-----	-----	21.64
13.07	18.45	138.04	21.51	-----	-----	-----	0.203	21.31	-----	-----	-----	21.51
13.10	17.50	138.03	21.34	-----	-----	-----	0.144	21.19	-----	-----	-----	21.34
13.13	16.60	138.01	21.13	-----	-----	-----	0.072	21.05	-----	-----	-----	21.13
13.17	15.80	138.00	20.89	-----	-----	-----	-----	20.89	-----	-----	-----	20.89
13.20	15.11	137.98	20.69	-----	-----	-----	-----	20.69	-----	-----	-----	20.69
13.23	14.54	137.96	20.48	-----	-----	-----	-----	20.47	-----	-----	-----	20.47
13.27	14.06	137.94	20.25	-----	-----	-----	-----	20.25	-----	-----	-----	20.25

Continues on next page...

Rout Basin 1

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.30	13.65	137.92	20.01	-----	-----	-----	-----	20.01	-----	-----	-----	20.01
13.33	13.29	137.90	19.79	-----	-----	-----	-----	19.78	-----	-----	-----	19.78
13.37	12.97	137.88	19.69	-----	-----	-----	-----	19.69	-----	-----	-----	19.69
13.40	12.69	137.85	19.59	-----	-----	-----	-----	19.59	-----	-----	-----	19.59

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 9

EW-2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 7.686 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 44,286 cuft
Drainage area	= 3.110 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.4 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(2.950 x 61) + (0.160 x 74)] / 3.110

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs	-- Outflow cfs)
12.20	7.130
12.23	7.424
12.27	7.585
12.30	7.663
12.33	7.686
<<	
12.37	7.655
12.40	7.569
12.43	7.430
12.47	7.240
12.50	7.000

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 10

EW-2 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 22.80 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 111,230 cuft
Drainage area	= 3.600 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.3 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.600 x 98)] / 3.600

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	20.88
12.10	22.48
12.13	22.80
<<	
12.17	22.25
12.20	21.30

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 11

EW-3 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.120 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 4,871 cuft
Drainage area	= 0.340 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.5 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.340 x 61)] / 0.340

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.10	1.074
12.13	1.120
<<	
12.17	1.120
12.20	1.095
12.23	1.058
12.27	1.011

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 12

EW-3 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 8.540 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 35,753 cuft
Drainage area	= 1.200 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.4 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(1.200 x 98)] / 1.200

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	8.496
12.10	8.540
<<	
12.13	8.009

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 13

EW-4 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 10.49 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 65,964 cuft
Drainage area	= 4.700 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.5 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(4.680 x 61) + (0.020 x 74)] / 4.700

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.23	9.584
12.27	9.982
12.30	10.23
12.33	10.38
12.37	10.47
12.40	10.49
<<	
12.43	10.45
12.47	10.34
12.50	10.17
12.53	9.933
12.57	9.646

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 14

EW-4 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 17.98 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 87,748 cuft
Drainage area	= 2.840 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.1 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(2.840 x 98)] / 2.840

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs	-- Outflow cfs)
12.07	16.47
12.10	17.74
12.13	17.98
<<	
12.17	17.56
12.20	16.80

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 15

Composite Storm Sewer

Hydrograph type	= Combine	Peak discharge	= 63.29 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 349,853 cuft
Inflow hyds.	= 9, 10, 11, 12, 13, 14	Contrib. drain. area	= 15.790 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 9 + (cfs)	Hyd. 10 + (cfs)	Hyd. 11 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 14 = (cfs)	Outflow (cfs)
12.10	5.308	22.48	1.074	8.540 <<	6.454	17.74	61.60
12.13	6.027	22.80 <<	1.120 <<	8.009	7.353	17.98 <<	63.29
<<							
12.17	6.659	22.25	1.120	7.230	8.221	17.56	63.04
12.20	7.130	21.30	1.095	6.386	8.991	16.80	61.70
12.23	7.424	20.16	1.058	5.530	9.584	15.90	59.65
12.27	7.585	18.86	1.011	4.748	9.982	14.88	57.06

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Mar 24, 2015

Hyd. No. 16

Overland to Basin 2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 9.017 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 52,085 cuft
Drainage area	= 3.770 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.9 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.770 x 61)] / 3.770

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.20	8.336
12.23	8.688
12.27	8.884
12.30	8.983
12.33	9.017
<<	
12.37	8.987
12.40	8.892
12.43	8.734
12.47	8.516
12.50	8.238

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 17

Overland to Basin 2 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 2.072 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 13,407 cuft
Drainage area	= 0.450 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.8 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.450 x 98)] / 0.450

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.17	1.933
12.20	2.022
12.23	2.064
12.27	2.072
<<	
12.30	2.060
12.33	2.036
12.37	1.999
12.40	1.949
12.43	1.888

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 18

Route 322 Road Runoff

Hydrograph type	= SCS Runoff	Peak discharge	= 10.51 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 56,608 cuft
Drainage area	= 1.900 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.0 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(1.900 x 98)] / 1.900

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.10	9.770
12.13	10.35
12.17	10.51
<<	
12.20	10.39
12.23	10.12
12.27	9.777

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 19

Composite to Basin 2

Hydrograph type	= Combine	Peak discharge	= 83.26 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 471,953 cuft
Inflow hyds.	= 15, 16, 17, 18	Contrib. drain. area	= 6.120 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 15 + (cfs)	Hyd. 16 + (cfs)	Hyd. 17 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
12.10	61.60	6.179	1.634	9.770	79.18
12.13	63.29 <<	7.028	1.798	10.35	82.46
12.17	63.04	7.775	1.933	10.51 <<	83.26
<<					
12.20	61.70	8.336	2.022	10.39	82.45
12.23	59.65	8.688	2.064	10.12	80.53
12.27	57.06	8.884	2.072 <<	9.777	77.79

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 20

Rout Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 56.83 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.47 hrs
Time interval	= 2 min	Hyd. volume	= 363,776 cuft
Inflow hyd. No.	= 19 - Composite to Basin 2	Reservoir name	= Basin 2
Max. Elevation	= 132.98 ft	Max. Storage	= 197,805 cuft

Storage Indication method used.

(Printed values >= 90.00% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.37	67.13	132.95	36.28	-----	-----	-----	4.517	31.76	15.49	-----	-----	51.77
12.40	63.03	132.97	36.92	-----	-----	-----	5.166	31.75	18.40	-----	-----	55.32
12.43	58.86	132.98	37.19	-----	-----	-----	5.439	31.75	19.63	-----	-----	56.82
12.47	54.85	132.98 <<	37.19	-----	-----	-----	5.440	31.75	19.64	-----	-----	56.83
<<												
12.50	51.04	132.97	37.00	-----	-----	-----	5.252	31.75	18.79	-----	-----	55.79
12.53	47.36	132.96	36.69	-----	-----	-----	4.931	31.75	17.35	-----	-----	54.03
12.57	43.83	132.95	36.28	-----	-----	-----	4.520	31.76	15.50	-----	-----	51.78

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 21

Travel Time to Basin 3

Hydrograph type	= Reach	Peak discharge	= 59.47 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.47 hrs
Time interval	= 2 min	Hyd. volume	= 363,691 cuft
Inflow hyd. No.	= 20 - Rout Basin 2	Section type	= Circular
Reach length	= 63.0 ft	Channel slope	= 13.49 %
Manning's n	= 0.013	Pipe diameter	= 1.50 ft
Side slope	= n/a	Max. depth	= n/a
Rating curve x	= 24.304	Rating curve m	= 1.250
Ave. velocity	= 32.16 ft/s	Routing coeff.	= 1.9491

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
12.40	55.32	56.67
12.43	56.82	54.04
12.47	56.83 <<	59.47
<<		
12.50	55.79	54.33
12.53	54.03	57.18

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 22

Overland Basin 3 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 9.253 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 49,712 cuft
Drainage area	= 3.520 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.6 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(3.520 x 61)] / 3.520

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.17	8.637
12.20	9.015
12.23	9.194
12.27	9.253
<<	
12.30	9.237
12.33	9.147
12.37	8.985
12.40	8.754
12.43	8.457

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 23

Overland to Basin 3 Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 24.19 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 118,027 cuft
Drainage area	= 3.820 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.9 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.220 x 98) + (3.600 x 98)] / 3.820

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.07	22.16
12.10	23.86
12.13	24.19
<<	
12.17	23.61
12.20	22.60

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 24

Composite to Basin 3

Hydrograph type	= Combine	Peak discharge	= 78.82 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 531,430 cuft
Inflow hyds.	= 21, 22, 23	Contrib. drain. area	= 7.340 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 21 + (cfs)	Hyd. 22 + (cfs)	Hyd. 23 = (cfs)	Outflow (cfs)
12.40	56.67	8.754	13.39	78.82
<<				
12.43	54.04	8.457	11.76	74.25
12.47	59.47 <<	8.097	10.34	77.90
12.50	54.33	7.677	9.165	71.17
12.53	57.18	7.207	8.149	72.54

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 25

Rout Basin 3

Hydrograph type	= Reservoir	Peak discharge	= 2.537 cfs
Storm frequency	= 100 yrs	Time to peak	= 22.63 hrs
Time interval	= 2 min	Hyd. volume	= 397,424 cuft
Inflow hyd. No.	= 24 - Composite to Basin 3	Reservoir name	= Basin 3
Max. Elevation	= 132.04 ft	Max. Storage	= 424,336 cuft

Storage Indication method used.

(Printed values >= 90.00% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
16.47	6.824	131.88	2.292	-----	-----	-----	-----	2.286	-----	-----	-----	2.286
16.50	6.750	131.88	2.296	-----	-----	-----	-----	2.291	-----	-----	-----	2.291
16.53	6.700	131.88	2.300	-----	-----	-----	-----	2.295	-----	-----	-----	2.295
16.57	6.629	131.89	2.303	-----	-----	-----	-----	2.300	-----	-----	-----	2.300
16.60	6.579	131.89	2.307	-----	-----	-----	-----	2.304	-----	-----	-----	2.304
16.63	6.511	131.89	2.311	-----	-----	-----	-----	2.308	-----	-----	-----	2.308
16.67	6.463	131.89	2.314	-----	-----	-----	-----	2.313	-----	-----	-----	2.313
16.70	6.397	131.90	2.318	-----	-----	-----	-----	2.317	-----	-----	-----	2.317
16.73	6.349	131.90	2.321	-----	-----	-----	-----	2.321	-----	-----	-----	2.321
16.77	6.287	131.90	2.325	-----	-----	-----	-----	2.325	-----	-----	-----	2.325
16.80	6.239	131.90	2.329	-----	-----	-----	-----	2.329	-----	-----	-----	2.329
16.83	6.179	131.91	2.333	-----	-----	-----	-----	2.332	-----	-----	-----	2.332
16.87	6.132	131.91	2.337	-----	-----	-----	-----	2.336	-----	-----	-----	2.336
16.90	6.074	131.91	2.341	-----	-----	-----	-----	2.340	-----	-----	-----	2.340
16.93	6.028	131.91	2.345	-----	-----	-----	-----	2.343	-----	-----	-----	2.343
16.97	5.971	131.92	2.349	-----	-----	-----	-----	2.347	-----	-----	-----	2.347
17.00	5.926	131.92	2.353	-----	-----	-----	-----	2.351	-----	-----	-----	2.351
17.03	5.871	131.92	2.356	-----	-----	-----	-----	2.354	-----	-----	-----	2.354
17.07	5.826	131.92	2.360	-----	-----	-----	-----	2.357	-----	-----	-----	2.357
17.10	5.773	131.92	2.364	-----	-----	-----	-----	2.361	-----	-----	-----	2.361

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Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
17.13	5.729	131.93	2.367	-----	-----	-----	-----	2.364	-----	-----	-----	2.364
17.17	5.677	131.93	2.371	-----	-----	-----	-----	2.367	-----	-----	-----	2.367
17.20	5.634	131.93	2.374	-----	-----	-----	-----	2.371	-----	-----	-----	2.371
17.23	5.583	131.93	2.378	-----	-----	-----	-----	2.374	-----	-----	-----	2.374
17.27	5.540	131.93	2.381	-----	-----	-----	-----	2.377	-----	-----	-----	2.377
17.30	5.491	131.94	2.384	-----	-----	-----	-----	2.380	-----	-----	-----	2.380
17.33	5.448	131.94	2.388	-----	-----	-----	-----	2.383	-----	-----	-----	2.383
17.37	5.400	131.94	2.391	-----	-----	-----	-----	2.386	-----	-----	-----	2.386
17.40	5.358	131.94	2.394	-----	-----	-----	-----	2.389	-----	-----	-----	2.389
17.43	5.311	131.94	2.397	-----	-----	-----	-----	2.392	-----	-----	-----	2.392
17.47	5.269	131.95	2.400	-----	-----	-----	-----	2.395	-----	-----	-----	2.395
17.50	5.223	131.95	2.403	-----	-----	-----	-----	2.397	-----	-----	-----	2.397
17.53	5.181	131.95	2.406	-----	-----	-----	-----	2.400	-----	-----	-----	2.400
17.57	5.136	131.95	2.409	-----	-----	-----	-----	2.403	-----	-----	-----	2.403
17.60	5.095	131.95	2.412	-----	-----	-----	-----	2.406	-----	-----	-----	2.406
17.63	5.050	131.96	2.415	-----	-----	-----	-----	2.408	-----	-----	-----	2.408
17.67	5.010	131.96	2.418	-----	-----	-----	-----	2.411	-----	-----	-----	2.411
17.70	4.966	131.96	2.420	-----	-----	-----	-----	2.413	-----	-----	-----	2.413
17.73	4.925	131.96	2.423	-----	-----	-----	-----	2.416	-----	-----	-----	2.416
17.77	4.882	131.96	2.426	-----	-----	-----	-----	2.418	-----	-----	-----	2.418
17.80	4.842	131.96	2.428	-----	-----	-----	-----	2.421	-----	-----	-----	2.421
17.83	4.799	131.96	2.431	-----	-----	-----	-----	2.423	-----	-----	-----	2.423
17.87	4.759	131.97	2.433	-----	-----	-----	-----	2.425	-----	-----	-----	2.425
17.90	4.721	131.97	2.436	-----	-----	-----	-----	2.427	-----	-----	-----	2.427
17.93	4.685	131.97	2.438	-----	-----	-----	-----	2.430	-----	-----	-----	2.430
17.97	4.647	131.97	2.440	-----	-----	-----	-----	2.432	-----	-----	-----	2.432
18.00	4.611	131.97	2.443	-----	-----	-----	-----	2.434	-----	-----	-----	2.434

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Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
18.03	4.573	131.97	2.445	-----	-----	-----	-----	2.436	-----	-----	-----	2.436
18.07	4.538	131.97	2.447	-----	-----	-----	-----	2.438	-----	-----	-----	2.438
18.10	4.501	131.98	2.449	-----	-----	-----	-----	2.440	-----	-----	-----	2.440
18.13	4.467	131.98	2.452	-----	-----	-----	-----	2.442	-----	-----	-----	2.442
18.17	4.432	131.98	2.454	-----	-----	-----	-----	2.444	-----	-----	-----	2.444
18.20	4.400	131.98	2.456	-----	-----	-----	-----	2.446	-----	-----	-----	2.446
18.23	4.366	131.98	2.458	-----	-----	-----	-----	2.448	-----	-----	-----	2.448
18.27	4.336	131.98	2.460	-----	-----	-----	-----	2.450	-----	-----	-----	2.450
18.30	4.304	131.98	2.462	-----	-----	-----	-----	2.452	-----	-----	-----	2.452
18.33	4.275	131.98	2.464	-----	-----	-----	-----	2.454	-----	-----	-----	2.454
18.37	4.245	131.99	2.466	-----	-----	-----	-----	2.455	-----	-----	-----	2.455
18.40	4.217	131.99	2.468	-----	-----	-----	-----	2.457	-----	-----	-----	2.457
18.43	4.189	131.99	2.469	-----	-----	-----	-----	2.459	-----	-----	-----	2.459
18.47	4.162	131.99	2.471	-----	-----	-----	-----	2.460	-----	-----	-----	2.460
18.50	4.135	131.99	2.473	-----	-----	-----	-----	2.462	-----	-----	-----	2.462
18.53	4.109	131.99	2.475	-----	-----	-----	-----	2.464	-----	-----	-----	2.464
18.57	4.083	131.99	2.476	-----	-----	-----	-----	2.465	-----	-----	-----	2.465
18.60	4.059	131.99	2.478	-----	-----	-----	-----	2.467	-----	-----	-----	2.467
18.63	4.034	131.99	2.480	-----	-----	-----	-----	2.468	-----	-----	-----	2.468
18.67	4.010	132.00	2.481	-----	-----	-----	-----	2.470	-----	-----	-----	2.470
18.70	3.986	132.00	2.483	-----	-----	-----	-----	2.472	-----	-----	-----	2.472
18.73	3.963	132.00	2.485	-----	-----	-----	-----	2.473	-----	-----	-----	2.473
18.77	3.940	132.00	2.486	-----	-----	-----	-----	2.474	-----	-----	-----	2.474
18.80	3.918	132.00	2.488	-----	-----	-----	-----	2.476	-----	-----	-----	2.476
18.83	3.896	132.00	2.489	-----	-----	-----	-----	2.477	-----	-----	-----	2.477
18.87	3.874	132.00	2.491	-----	-----	-----	-----	2.479	-----	-----	-----	2.479
18.90	3.853	132.00	2.492	-----	-----	-----	-----	2.480	-----	-----	-----	2.480

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Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
18.93	3.832	132.00	2.493	-----	-----	-----	-----	2.481	-----	-----	-----	2.481
18.97	3.811	132.00	2.495	-----	-----	-----	-----	2.483	-----	-----	-----	2.482
19.00	3.792	132.00	2.496	-----	-----	-----	-----	2.484	-----	-----	-----	2.484
19.03	3.771	132.00	2.497	-----	-----	-----	-----	2.485	-----	-----	-----	2.485
19.07	3.752	132.01	2.498	-----	-----	-----	-----	2.486	-----	-----	-----	2.486
19.10	3.733	132.01	2.500	-----	-----	-----	-----	2.487	-----	-----	-----	2.487
19.13	3.714	132.01	2.501	-----	-----	-----	-----	2.489	-----	-----	-----	2.489
19.17	3.695	132.01	2.502	-----	-----	-----	-----	2.490	-----	-----	-----	2.490
19.20	3.677	132.01	2.503	-----	-----	-----	-----	2.491	-----	-----	-----	2.491
19.23	3.659	132.01	2.504	-----	-----	-----	-----	2.492	-----	-----	-----	2.492
19.27	3.641	132.01	2.505	-----	-----	-----	-----	2.493	-----	-----	-----	2.493
19.30	3.623	132.01	2.506	-----	-----	-----	-----	2.494	-----	-----	-----	2.494
19.33	3.606	132.01	2.507	-----	-----	-----	-----	2.495	-----	-----	-----	2.495
19.37	3.589	132.01	2.508	-----	-----	-----	-----	2.496	-----	-----	-----	2.496
19.40	3.572	132.01	2.510	-----	-----	-----	-----	2.497	-----	-----	-----	2.497
19.43	3.555	132.01	2.511	-----	-----	-----	-----	2.498	-----	-----	-----	2.498
19.47	3.539	132.01	2.512	-----	-----	-----	-----	2.499	-----	-----	-----	2.499
19.50	3.523	132.01	2.513	-----	-----	-----	-----	2.500	-----	-----	-----	2.500
19.53	3.507	132.02	2.514	-----	-----	-----	-----	2.501	-----	-----	-----	2.501
19.57	3.491	132.02	2.514	-----	-----	-----	-----	2.502	-----	-----	-----	2.502
19.60	3.475	132.02	2.515	-----	-----	-----	-----	2.503	-----	-----	-----	2.503
19.63	3.459	132.02	2.516	-----	-----	-----	-----	2.504	-----	-----	-----	2.504
19.67	3.444	132.02	2.517	-----	-----	-----	-----	2.505	-----	-----	-----	2.505
19.70	3.429	132.02	2.518	-----	-----	-----	-----	2.506	-----	-----	-----	2.506
19.73	3.414	132.02	2.519	-----	-----	-----	-----	2.507	-----	-----	-----	2.507
19.77	3.399	132.02	2.520	-----	-----	-----	-----	2.508	-----	-----	-----	2.508
19.80	3.384	132.02	2.521	-----	-----	-----	-----	2.508	-----	-----	-----	2.508

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Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.83	3.369	132.02	2.522	-----	-----	-----	-----	2.509	-----	-----	-----	2.509
19.87	3.355	132.02	2.522	-----	-----	-----	-----	2.510	-----	-----	-----	2.510
19.90	3.340	132.02	2.523	-----	-----	-----	-----	2.511	-----	-----	-----	2.511
19.93	3.326	132.02	2.524	-----	-----	-----	-----	2.512	-----	-----	-----	2.512
19.97	3.312	132.02	2.525	-----	-----	-----	-----	2.512	-----	-----	-----	2.512
20.00	3.298	132.02	2.525	-----	-----	-----	-----	2.513	-----	-----	-----	2.513
20.03	3.284	132.02	2.526	-----	-----	-----	-----	2.514	-----	-----	-----	2.514
20.07	3.270	132.02	2.527	-----	-----	-----	-----	2.515	-----	-----	-----	2.515
20.10	3.257	132.02	2.528	-----	-----	-----	-----	2.515	-----	-----	-----	2.515
20.13	3.243	132.02	2.528	-----	-----	-----	-----	2.516	-----	-----	-----	2.516
20.17	3.230	132.03	2.529	-----	-----	-----	-----	2.517	-----	-----	-----	2.517
20.20	3.216	132.03	2.530	-----	-----	-----	-----	2.517	-----	-----	-----	2.517
20.23	3.203	132.03	2.530	-----	-----	-----	-----	2.518	-----	-----	-----	2.518
20.27	3.190	132.03	2.531	-----	-----	-----	-----	2.519	-----	-----	-----	2.519
20.30	3.176	132.03	2.532	-----	-----	-----	-----	2.519	-----	-----	-----	2.519
20.33	3.163	132.03	2.532	-----	-----	-----	-----	2.520	-----	-----	-----	2.520
20.37	3.150	132.03	2.533	-----	-----	-----	-----	2.521	-----	-----	-----	2.521
20.40	3.137	132.03	2.534	-----	-----	-----	-----	2.521	-----	-----	-----	2.521
20.43	3.124	132.03	2.534	-----	-----	-----	-----	2.522	-----	-----	-----	2.522
20.47	3.112	132.03	2.535	-----	-----	-----	-----	2.522	-----	-----	-----	2.522
20.50	3.099	132.03	2.535	-----	-----	-----	-----	2.523	-----	-----	-----	2.523
20.53	3.086	132.03	2.536	-----	-----	-----	-----	2.523	-----	-----	-----	2.523
20.57	3.074	132.03	2.536	-----	-----	-----	-----	2.524	-----	-----	-----	2.524
20.60	3.061	132.03	2.537	-----	-----	-----	-----	2.524	-----	-----	-----	2.524
20.63	3.049	132.03	2.537	-----	-----	-----	-----	2.525	-----	-----	-----	2.525
20.67	3.036	132.03	2.538	-----	-----	-----	-----	2.525	-----	-----	-----	2.525
20.70	3.024	132.03	2.538	-----	-----	-----	-----	2.526	-----	-----	-----	2.526

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Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
20.73	3.011	132.03	2.539	-----	-----	-----	-----	2.526	-----	-----	-----	2.526
20.77	2.999	132.03	2.539	-----	-----	-----	-----	2.527	-----	-----	-----	2.527
20.80	2.987	132.03	2.540	-----	-----	-----	-----	2.527	-----	-----	-----	2.527
20.83	2.975	132.03	2.540	-----	-----	-----	-----	2.528	-----	-----	-----	2.528
20.87	2.962	132.03	2.541	-----	-----	-----	-----	2.528	-----	-----	-----	2.528
20.90	2.950	132.03	2.541	-----	-----	-----	-----	2.529	-----	-----	-----	2.529
20.93	2.938	132.03	2.541	-----	-----	-----	-----	2.529	-----	-----	-----	2.529
20.97	2.926	132.03	2.542	-----	-----	-----	-----	2.529	-----	-----	-----	2.529
21.00	2.914	132.03	2.542	-----	-----	-----	-----	2.530	-----	-----	-----	2.530
21.03	2.902	132.03	2.543	-----	-----	-----	-----	2.530	-----	-----	-----	2.530
21.07	2.890	132.03	2.543	-----	-----	-----	-----	2.530	-----	-----	-----	2.530
21.10	2.878	132.03	2.543	-----	-----	-----	-----	2.531	-----	-----	-----	2.531
21.13	2.867	132.03	2.544	-----	-----	-----	-----	2.531	-----	-----	-----	2.531
21.17	2.855	132.03	2.544	-----	-----	-----	-----	2.531	-----	-----	-----	2.531
21.20	2.843	132.03	2.544	-----	-----	-----	-----	2.532	-----	-----	-----	2.532
21.23	2.831	132.04	2.544	-----	-----	-----	-----	2.532	-----	-----	-----	2.532
21.27	2.819	132.04	2.545	-----	-----	-----	-----	2.532	-----	-----	-----	2.532
21.30	2.808	132.04	2.545	-----	-----	-----	-----	2.532	-----	-----	-----	2.532
21.33	2.796	132.04	2.545	-----	-----	-----	-----	2.533	-----	-----	-----	2.533
21.37	2.784	132.04	2.545	-----	-----	-----	-----	2.533	-----	-----	-----	2.533
21.40	2.773	132.04	2.546	-----	-----	-----	-----	2.533	-----	-----	-----	2.533
21.43	2.761	132.04	2.546	-----	-----	-----	-----	2.533	-----	-----	-----	2.533
21.47	2.749	132.04	2.546	-----	-----	-----	-----	2.534	-----	-----	-----	2.534
21.50	2.738	132.04	2.546	-----	-----	-----	-----	2.534	-----	-----	-----	2.534
21.53	2.726	132.04	2.547	-----	-----	-----	-----	2.534	-----	-----	-----	2.534
21.57	2.715	132.04	2.547	-----	-----	-----	-----	2.534	-----	-----	-----	2.534
21.60	2.703	132.04	2.547	-----	-----	-----	-----	2.534	-----	-----	-----	2.534

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Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
21.63	2.692	132.04	2.547	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.67	2.680	132.04	2.547	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.70	2.669	132.04	2.547	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.73	2.657	132.04	2.547	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.77	2.646	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.80	2.634	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.83	2.623	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.87	2.611	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.90	2.600	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.93	2.589	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
21.97	2.577	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
22.00	2.566	132.04	2.548	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
22.03	2.601	132.04	2.548	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
22.07	2.643	132.04	2.548	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
22.10	2.690	132.04	2.548	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
22.13	2.695	132.04	2.548	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
22.17	2.700	132.04	2.549	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
22.20	2.692	132.04	2.549	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
22.23	2.684	132.04	2.549	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
22.27	2.675	132.04	2.549	-----	-----	-----	-----	2.536	-----	-----	-----	2.537
22.30	2.664	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.33	2.651	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.37	2.637	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.40	2.622	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.43	2.606	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.47	2.588	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.50	2.579	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537

Continues on next page...

Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
22.53	2.570	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.57	2.560	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.60	2.551	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.63	2.540	132.04 <<	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
<<												
22.67	2.530	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.70	2.519	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.73	2.508	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.77	2.497	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.80	2.488	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.83	2.480	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.87	2.471	132.04	2.550	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.90	2.461	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.93	2.452	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
22.97	2.443	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
23.00	2.433	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
23.03	2.424	132.04	2.549	-----	-----	-----	-----	2.537	-----	-----	-----	2.537
23.07	2.414	132.04	2.549	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
23.10	2.405	132.04	2.549	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
23.13	2.396	132.04	2.549	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
23.17	2.386	132.04	2.549	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
23.20	2.377	132.04	2.548	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
23.23	2.367	132.04	2.548	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
23.27	2.358	132.04	2.548	-----	-----	-----	-----	2.536	-----	-----	-----	2.536
23.30	2.349	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
23.33	2.340	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
23.37	2.331	132.04	2.548	-----	-----	-----	-----	2.535	-----	-----	-----	2.535

Continues on next page...

Rout Basin 3

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
23.40	2.321	132.04	2.547	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
23.43	2.312	132.04	2.547	-----	-----	-----	-----	2.535	-----	-----	-----	2.535
23.47	2.303	132.04	2.547	-----	-----	-----	-----	2.534	-----	-----	-----	2.534
23.50	2.294	132.04	2.547	-----	-----	-----	-----	2.534	-----	-----	-----	2.534
23.53	2.285	132.04	2.546	-----	-----	-----	-----	2.534	-----	-----	-----	2.534
23.57	2.276	132.04	2.546	-----	-----	-----	-----	2.534	-----	-----	-----	2.534
23.60	2.268	132.04	2.546	-----	-----	-----	-----	2.533	-----	-----	-----	2.533
23.63	2.262	132.04	2.546	-----	-----	-----	-----	2.533	-----	-----	-----	2.533
23.67	2.254	132.04	2.545	-----	-----	-----	-----	2.533	-----	-----	-----	2.533
23.70	2.248	132.04	2.545	-----	-----	-----	-----	2.533	-----	-----	-----	2.533
23.73	2.240	132.04	2.545	-----	-----	-----	-----	2.532	-----	-----	-----	2.532
23.77	2.234	132.04	2.545	-----	-----	-----	-----	2.532	-----	-----	-----	2.532
23.80	2.226	132.04	2.544	-----	-----	-----	-----	2.532	-----	-----	-----	2.532
23.83	2.219	132.03	2.544	-----	-----	-----	-----	2.532	-----	-----	-----	2.532
23.87	2.212	132.03	2.544	-----	-----	-----	-----	2.531	-----	-----	-----	2.531
23.90	2.205	132.03	2.543	-----	-----	-----	-----	2.531	-----	-----	-----	2.531
23.93	2.197	132.03	2.543	-----	-----	-----	-----	2.531	-----	-----	-----	2.531
23.97	2.190	132.03	2.543	-----	-----	-----	-----	2.530	-----	-----	-----	2.530
24.00	2.183	132.03	2.542	-----	-----	-----	-----	2.530	-----	-----	-----	2.530
24.03	2.159	132.03	2.542	-----	-----	-----	-----	2.530	-----	-----	-----	2.530
24.07	2.115	132.03	2.542	-----	-----	-----	-----	2.529	-----	-----	-----	2.529
24.10	2.054	132.03	2.541	-----	-----	-----	-----	2.529	-----	-----	-----	2.529
24.13	1.989	132.03	2.541	-----	-----	-----	-----	2.528	-----	-----	-----	2.528
24.17	1.922	132.03	2.540	-----	-----	-----	-----	2.528	-----	-----	-----	2.528
24.20	1.857	132.03	2.540	-----	-----	-----	-----	2.527	-----	-----	-----	2.527
24.23	1.795	132.03	2.539	-----	-----	-----	-----	2.527	-----	-----	-----	2.527
24.27	1.735	132.03	2.538	-----	-----	-----	-----	2.526	-----	-----	-----	2.526

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 26

Pre Developed Area A

Hydrograph type	= SCS Runoff	Peak discharge	= 34.58 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.00 hrs
Time interval	= 2 min	Hyd. volume	= 429,461 cuft
Drainage area	= 30.000 ac	Curve number	= 62*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 69.6 min
Total precip.	= 8.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(7.790 x 55) + (10.250 x 58) + (0.680 x 61) + (5.700 x 71) + (5.170 x 70) + (0.410 x 98)] / 30.000

Hydrograph Discharge Table

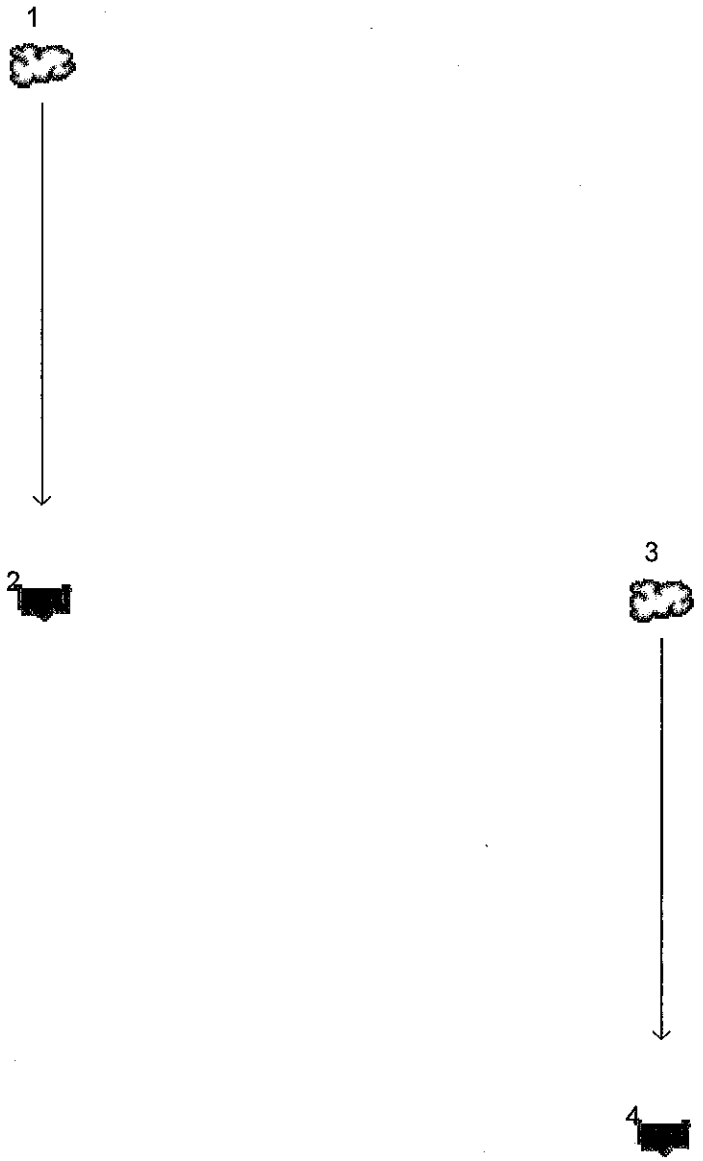
(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)	
12.67	31.28	13.23	33.60
12.70	32.12	13.27	33.38
12.73	32.76	13.30	33.15
12.77	33.26	13.33	32.91
12.80	33.66	13.37	32.65
12.83	33.98	13.40	32.38
12.87	34.23	13.43	32.10
12.90	34.41	13.47	31.82
12.93	34.52	13.50	31.52
12.97	34.58	13.53	31.21
13.00	34.58		
<<		...End	
13.03	34.54		
13.07	34.45		
13.10	34.33		
13.13	34.18		
13.17	34.00		
13.20	33.81		

BASIN QUALITY CALCULATIONS

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8



Project: 2015-03-27_Quality.gpw	Monday, Mar 23, 2015

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	6.222	5	70	14,324	------	------	------	Dirty Water to Basin 1
2	Reservoir	0.000	5	n/a	0	1	131.70	14,324	Rout Basin 1
3	SCS Runoff	10.12	5	730	57,641	------	------	------	Dirty Water to Basin 2
4	Reservoir	0.000	5	n/a	0	3	130.94	57,641	Rout Basin 2

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Pond No. 1 - Basin 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 131.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	131.00	19,470	0	0
1.00	132.00	21,658	20,552	20,552
2.00	133.00	23,900	22,768	43,320
3.00	134.00	26,826	25,346	68,666
4.00	135.00	29,328	28,065	96,731
5.00	136.00	31,887	30,596	127,327
6.00	137.00	34,506	33,184	160,511
7.00	138.00	37,183	35,833	196,344
8.00	139.00	40,579	38,865	235,209

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 42.00	0.00	0.00	0.00
Span (in)	= 42.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 133.37	0.00	0.00	0.00
Length (ft)	= 65.00	0.00	0.00	0.00
Slope (%)	= 0.18	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	1.00	100.00	0.00
Crest El. (ft)	= 138.05	133.50	138.10	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	Broad	---
Multi-Stage	= Yes	Yes	Yes	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	131.00	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
1.00	20,552	132.00	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
2.00	43,320	133.00	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
3.00	68,666	134.00	0.97 oc	---	---	---	0.00	0.97 s	0.00	---	---	---	0.967
4.00	96,731	135.00	4.77 oc	---	---	---	0.00	4.74 s	0.00	---	---	---	4.741
5.00	127,327	136.00	9.83 oc	---	---	---	0.00	9.83 s	0.00	---	---	---	9.835
6.00	160,511	137.00	15.65 oc	---	---	---	0.00	15.59 s	0.00	---	---	---	15.59
7.00	196,344	138.00	21.11 oc	---	---	---	0.00	21.10 s	0.00	---	---	---	21.10
8.00	235,209	139.00	84.11 oc	---	---	---	10.83 s	5.12 s	68.00 s	---	---	---	83.96

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Pond No. 2 - Basin 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 130.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	130.00	58,452	0	0
1.00	131.00	64,484	61,437	61,437
2.00	132.00	69,040	66,742	128,180
3.00	133.00	73,683	71,342	199,521
4.00	134.00	77,713	75,682	275,203

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 38.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 127.00	0.00	0.00	0.00
Length (ft)	= 56.00	0.00	0.00	0.00
Slope (%)	= 9.82	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	9.00	100.00	0.00
Crest El. (ft)	= 132.75	131.75	132.80	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= 1	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	130.00	0.00	---	---	---	0.00	0.00	0.00	---	---	---	0.000
1.00	61,437	131.00	43.13 ic	---	---	---	0.00	0.00	0.00	---	---	---	0.000
2.00	128,180	132.00	43.13 ic	---	---	---	0.00	3.75	0.00	---	---	---	3.746
3.00	199,521	133.00	48.13 ic	---	---	---	6.24	41.88	23.25	---	---	---	71.38
4.00	275,203	134.00	73.86 ic	---	---	---	34.17 s	39.68 s	341.78	---	---	---	415.62

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 1

Dirty Water to Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 6.222 cfs
Storm frequency	= 1 yrs	Time to peak	= 1.17 hrs
Time interval	= 5 min	Hyd. volume	= 14,324 cuft
Drainage area	= 3.840 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.0 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= NJ Water Quality Storm	Shape factor	= 285

* Composite (Area/CN) = [(3.840 x 98)] / 3.840

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
1.17	6.222
1.25	6.020

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 2

Rout Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 1 - Dirty Water to Basin 1	Reservoir name	= Basin 1
Max. Elevation	= 131.70 ft	Max. Storage	= 14,324 cuft

Storage Indication method used.

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 3

Dirty Water to Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 10.12 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 57,641 cuft
Drainage area	= 6.220 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.0 min
Total precip.	= 2.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(6.220 x 98)] / 6.220

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.17	10.12
12.25	9.926
12.33	9.258

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Tuesday, Mar 24, 2015

Hyd. No. 4

Rout Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - Dirty Water to Basin 2	Reservoir name	= Basin 2
Max. Elevation	= 130.94 ft	Max. Storage	= 57,641 cuft

Storage Indication method used.

...End

GROUNDWATER RECHARGE CALCULATIONS

New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
GLOUCESTER CO., MONROE TWP	44.0	1.36

Project Name:	**Blaze Mill Townhouses**
Description:	**Proposed Development**
Analysis Date:	**03/27/15**

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	23.9	Meadow, Pasture, Grassland or range	Aura	12.2	1,059,095
2	9.3	Woods	Aura	11.8	399,180
3	16.5	Gravel, dirt	Aura	8.2	490,923
4	0.7	Open space	Aura	12.1	30,669
5	0.2	Impervious areas	Aura	0.0	-
6	0.5	Woods	Downer	12.3	22,250
7	5.4	Woods	Woodstown	9.6	188,830
8	5.7	Meadow, Pasture, Grassland or range	Woodstown	10.4	215,559
9					
10					
11					
12					
13					
14					
15					
Total =	62.2			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				10.7	2,406,505

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	14.2	Impervious areas	Aura	0.0	-
2	3.6	Impervious areas	Downer	0.0	-
3	22.9	Open space	Aura	12.1	1,003,310
4	4.3	Open space	Woodstown	10.2	158,875
5	0.1	Woods	Downer	12.3	4,450
6	0.4	Open space	Downer	13.0	18,875
7	5.8	Woods	Aura	11.8	248,951
8	5.8	adow, Pasture, Grassland or ra	Aura	12.2	257,019
9	1.1	Woods	Woodstown	9.6	38,465
10	4	adow, Pasture, Grassland or ra	Woodstown	10.4	151,269
11					
12					
13					
14					
15					
Total =	62.2			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				8.3	1,881,214

Annual Recharge Requirements Calculation ↓		
% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft) 775,368
Post-Development Annual Recharge Deficit=	***525,292***	(cubic feet)

Recharge Efficiency Parameters Calculations (area averages)

RWC=	4.35	(in)	DRWC=	0.89	(in)
ERWC =	1.39	(in)	EDRWC=	0.29	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

Project Name	Description	Analysis Date	BMP or LID Type
Blaze Mill Townhouses	Proposed Development	03/27/15	Infiltration Basin #2

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	58452.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	1.9	in
Upper level of the BMP surface (negative if above ground)	dBMPu	21.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	48.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	1	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.81	in
ERWC Modified to consider dEXC	EDRWC	0.00	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.00	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.33	in
Inches of Rainfall to capture	Pdesign	0.43	in
Recharge Provided Avg. over Imp. Area		17.9	in
Runoff Captured Avg. over imp. Area		17.9	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.17	unitless
BMP Volume	VBMP	9,468	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> **OK**
dBMP Check---> **OK**
dEXC Check---> **OK**
BMP Location---> **OK**

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	525,292	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	352,400	sq.ft
Root Zone Water Capacity	RWC	2.54	in
RWC Modified to consider dEXC	DRWC	0.00	in
Climatic Factor	C-factor	1.36	no units
Average Annual P	Pavg	44.0	in
Recharge Requirement over Imp. Area	dr	3.1	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		525,292	cu.ft
Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.5%	%
%Runoff Infiltrated		52.4%	%
%Runoff Recharged		23.8%	%
%Rainfall Recharged		18.5%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

BASIN SPILLWAY CALCULATIONS

EMERGENCY SPILLWAY DESIGN WORKSHEET

JOB No. 2958 7/31/2014

Revised 3/27/2015

BLAZE MILL DEVELOPMENT

BASIN #1 EMERGENCY SPILLWAY DESIGN

USING BROAD CRESTED WEIR EQUATIONS: Q=CLH^(3/2)

100 YEAR INFLOW = 66.64 CFS

BREADTH OF CREST = 10 FT

C=	2.56
H=	0.41 FT
L=	100 FT
Q=	67 CFS

A 100 FOOT SPILLWAY HAS BEEN DESIGNED TO PASS 70 CFS WITH A FLOW DEPTH OF 0.41 FEET

VELOCITY OVER SPILLWAY (BASED ON THE CONTINUITY EQUATION: Q=AV)

67 CFS = 43.53 x V

therefore: V = 67 cfs/43.53 sf = 1.54 feet per second

BASIN #3 EMERGENCY SPILLWAY DESIGN

USING BROAD CRESTED WEIR EQUATIONS: Q=CLH^(3/2)

100 YEAR DISCHARGE = 78.82 CFS

BREADTH OF CREST = 10 FT

C=	2.63	
H=	0.45	FT
L=	100	FT
Q=	79	CFS

A 100 FOOT SPILLWAY HAS BEEN DESIGNED TO PASS 79 CFS WITH A FLOW DEPTH OF 0.45 FEET

VELOCITY OVER SPILLWAY (BASED ON THE CONTINUITY EQUATION: Q=AV)

79 CFS = 45.61 x V

therefore: V = 79 cfs/45.61 sf = 1.73 feet per second

BASIN INFILTRATION CALCULATIONS

INFILTRATION CALCULATIONS

Equations and Terms

Q	=	K i A
Q	=	infiltration flow rate
K	=	hydraulic conductivity of soil (ft/hr)
i	=	hydraulic gradient = D_{AVG} / d
A	=	infiltration area
D	=	depth from ESHWT to bottom of infiltration area (ft)
d_{STORM}	=	depth from infiltration area bottom to storm event elevation
D_{AVG}	=	average distance from water surface to ESHWT
V	=	basin volume during storm event
T	=	time to infiltrate basin (hr) = V / Q
ESHWT	=	Estimated Seasonal High Water Table

Basin 1

Borings

Permeability of soil 2" -6.3" @ 30" depth = 5.75 in/hr

Design permeability rate = 0.5 x K_{TEST} = 2.875 in/hr = 0.24 ft/hr

Storm frequency	D (ft)	d_{STORM} (ft)	D_{AVG} (ft)	i (unitless)	A (sf)	Q (cf/hr)	V (cf)	T (hr)
WQ	2.50	0.70	2.85	1.14	19,470	5318	22,904	4.3
2 - year	2.50	3.22	4.11	1.64	19,470	7669	71,333	9.3
10 - year	2.50	4.44	4.72	1.89	19,470	8807	87,046	9.9
100 - year	2.50	7.05	6.03	2.41	19,470	11242	135,369	12.0

Basin 2

Borings

Permeability of soil 2" -6.3" @ 30" depth = 17.69 in/hr

Design permeability rate = 0.5 x K_{TEST} = 8.845 in/hr = 0.74 ft/hr

Storm frequency	D (ft)	d_{STORM} (ft)	D_{AVG} (ft)	i (unitless)	A (sf)	Q (cf/hr)	V (cf)	T (hr)
WQ	2.50	0.94	2.97	1.19	58,452	51184	90,631	1.8
2 - year	2.50	1.83	3.42	1.37	58,452	58853	110,700	1.9
10 - year	2.50	2.17	3.59	1.43	58,452	61782	145,443	2.4
100- year	2.50	2.98	3.99	1.60	58,452	68762	264,101	3.8

SOIL BORING LOGS WITH

PERMEABILITY RESULTS

SOUTH JERSEY ENGINEERS, L.L.C.

Septic System Design & Engineering

P.O. Box 1406 • Voorhees, N.J. 08043 • 1-856-651-9050 • 1-856-651-9051 (fax) • engineer@septics.com

Sandford Mersky, P.E.
Vincent Gioffre, NJDEP Licensed Operator (Wastewater)
Nicholas Bielecki, P.E., NJDEP Licensed Operator (Wastewater)

April 4, 2014

CLIENT:	James Sassano Associates, Inc
PROJECT:	Blaze Mill Subdivision
	Glassboro Williamstown Road
	Monroe Township, Gloucester County, New Jersey
REQUIREMENT:	Subsurface Explorations (Test Pits)
ATTENTION:	Rick Clemson, P.E.
	rick@jsaengineering.com

PURPOSE

The purpose of this report is to present the findings pertaining to the subsurface explorations (test pits) performed at the above project.

INVESTIGATION

A representative from South Jersey Engineers LLC, was present on March 25th of 2014 to witness the excavation of (17) seventeen surveyed test pits. The test pits were surveyed and their locations were provided by James Sassano Associates, Inc (JSA). The objective was to ascertain the following: estimate the seasonal high water-table, record ground water levels if encountered and establish soil profile logs. In addition, soil samples were obtained and returned to our office for analytical testing. See attached results.

FINDINGS

The in-situ soils encountered during the subsurface explorations consisted primarily of fine Sands & Loamy Sands. Refer to the attached soil profile logs for more detailed descriptions.

QUALIFICATIONS

If any conditions other than what was revealed through the subsurface explorations are encountered, we should be informed immediately of such conditions so that we may modify our findings. This report is based solely visual inspection on described above. Inspection by South Jersey Engineers, L.L.C. in no way releases the contractor or subcontractor of full responsibility of meeting contract documents, plans, specifications and standards in the industry. No other warranty is express or implied. No conclusions should be drawn from this report other than those specifically stated.

Respectfully,

South Jersey Engineers, L.L.C.

Test Pit #1	**Elevation 144.84**
Depth	**Description**
0"-14"	Topsoil
14"-38"	dark yellowish brown Loam; sub-angular blocky, friable
38"-104"	strong brown Sandy Loam; sub-angular blocky, friable
104"-128"	yellow medium to fine Sand; single grain, loose

Groundwater not Encountered
Estimated Seasonal High Water-table - Not observed

Test Pit #2	**Elevation 146.59**
Depth	**Description**
0"-12"	Topsoil
12"-31"	dark brown Loam; sub-angular blocky, friable
31"-65"	strong brown medium to fine Loamy Sand; sub-angular blocky, friable Gravel Content; 25%
65"-124"	yellowish red medium to fine Sand; single grain, loose

Groundwater not Encountered

Estimated Seasonal High Water-table- Not observed

Test Pit #3	**Elevation 148.70**
Depth	**Description**
0"-26"	Topsoil/ Abandoned mining equipment
26"-55"	strong brown Gravelly Loamy Sand /Sandy Loam; sub-angular blocky friable
	Gravel Content: 40%-medium to fine
55"-128"	yellowish red medium to fine Loamy Sand; sub-angular blocky, friable
128"-140"	pale brown fine to very fine Sand; single grain, loose

Groundwater not Encountered

Estimated Seasonal High Water-table –Not observed

Test Pit #4	**Elevation 131.16**	
Depth	**Description**	
0"-10"	Topsoil	
10"-42"	yellowish red fine to very fine Sand; sub-angular blocky, friable	
42"-108"	saturated gray fine to very fine Loamy Sand; sub-angular blocky, friable	
	mottles: yellowish red many distinct @ 42"-continuous throughout	
	Groundwater Encountered @ 81"	**(Elev. 124.41)**
	Estimated Seasonal High Water-table -42" Sidewalls kept collapsing	**(Elev. 127.70)**

Test Pit #5	**Elevation 129.85**	
Depth	**Description**	
0"-80"	mottled fine to very fine Sand /Loamy Sand	
	Soil saturated @ 15"	
	Groundwater Encountered @ 61"	**(Elev. 124.75)**
	Estimated Seasonal High Water Table -15"	**(Elev. 128.35)**
	Sidewalls kept collapsing	

Test Pit #6	**Elevation 129.09**	
Depth	**Description**	
0"-11"	yellow fine Sand; single grain, loose	
11"-86"	saturated pale brown fine Sand/ Loamy Sand; sub-angular blocky, friable	
	mottles: yellowish red many distinct @ 13"-continuous throughout	
	Groundwater Encountered @ 47"	**(Elev. 125.20)**
	Estimated Seasonal High Water Table -13"	**(Elev. 128.00)**
	Sidewalls kept collapsing	

Test Pit #7	**Elevation 128.41**	
Depth	**Description**	
0"-12"	yellow fine Sand; single grain, loose	
12"-92"	saturated pale red fine Sand; single grain, loose	
	mottles: gray bands many distinct @ 12"-continuous throughout	
	Groundwater Encountered @ 34"	**(Elev. 125.60)**
	Estimated Seasonal High Water Table-12"	**(Elev. 127.41)**
	Sidewalls kept collapsing	

Test Pit #8	**Elevation 129.10**	
Depth	**Description**	
0"-12"	mottled fine Sand /Loamy Sand; sub-angular blocky, friable	
12"-91"	saturated mottled Loamy Sand; sub-angular blocky, friable	
	Groundwater Encountered @ 49"	**(Elev. 125.00)**
	Estimated Seasonal High Water Table- 12"	**(Elev. 128.10)**
	Sidewalls kept collapsing	

Test Pit #9	**Elevation 129.75**	
Depth	**Description**	
0"-17"	yellow fine Sand; single grain, loose	
17"-108"	saturated pale brown fine to very fine Loamy Sand; sub-angular blocky, friable	
	Groundwater Encountered 57"	**(Elev. 125.00)**
	Estimated Seasonal High Water Table- 17"	**(Elev. 128.34)**
	Sidewalls kept collapsing	

]

Test Pit #10	**Elevation 130.30**
Depth	**Description**
0"-18"	yellow fine Sand; single grain, loose
18"-104"	pale brown fine to very fine Sand / Loamy Sand; sub-angular blocky, friable
	mottles: strong brown many prominent @ 18"- continuous throughout
	Groundwater Encountered @ 70" **(Elev. 124.50)**
	Estimated Seasonal High Water Table- 18" **(Elev. 128.80)**
	Sidewalls kept collapsing

Test Pit #11	**Elevation 130.95**
Depth	**Description**
0"-26"	yellow fine Loamy Sand; sub-angular blocky, friable
26"-104"	saturated strong brown fine Sand / Loamy Sand; sub-angular blocky, friable
	mottles: gray bands many prominent @ 26"- continuous throughout
	Groundwater Encountered @ 66" **(Elev. 125.45)**
	Estimated Seasonal High Water Table- 26" **(Elev. 128.75)**
	Sidewalls kept collapsing

Test Pit #12	**Elevation 130.46**
Depth	**Description**
0"-11"	yellow fine Sand; single grain, loose
11"-110"	saturated pale red fine to very fine Loamy Sand; sub-angular blocky, friable
	mottles: pale brown many prominent @ 14"- continuous throughout
	Groundwater Encountered @ 47" **(Elev. 126.55)**
	Estimated Seasonal High Water Table- 12" **(Elev. 129.46)**
	Sidewalls kept collapsing

Test Pit #13	**Elevation 132.43**
Depth	**Description**
0"-20"	white fine to very fine Sand; sub-angular blocky, friable
13"-41"	strong brown fine to very fine Sand; sub-angular blocky, friable
	mottles: yellow bands many distinct @ 31"- continuous throughout
41"-120"	mottled fine to very fine Sand /Loamy Sand; sub-angular blocky, friable
	Soil saturated @ 70"
	Groundwater not Encountered
	Estimated Seasonal High Water Table- 31" **(Elev. 129.83)**

Test Pit #14	**Elevation 137.51**
Depth	**Description**
0"-40"	Topsoil
40"-111"	strong brown fine Loamy Sand; sub-angular blocky, friable
	mottles: red common distinct @ 87"- continuous throughout
111"-131"	yellow fine Loamy Sand; sub-angular blocky, friable
	Groundwater not Encountered
	Estimated Seasonal High Water Table- 87" **(Elev. 130.30)**

Test Pit #15	**Elevation 127.99**
Depth	**Description**
0"-15"	yellowish brown Sand; sub-angular blocky, friable
15"-97"	saturated gray fine to very fine Sand / Loamy Sand; sub-angular blocky, friable
	mottles: red many distinct @ 15"- continuous throughout
	Groundwater Encountered @ 36" **(Elev. 125.00)**
	Estimated Seasonal High Water Table- 15" **(Elev. 126.74)**
	Sidewalls kept collapsing

Test Pit #16	**Elevation 129.03**	
Depth	**Description**	
0"-19"	yellow fine to very fine Sand; sub-angular blocky, friable	
19"-86"	pale brown fine to very fine Sand / Loamy Sand; sub-angular blocky, friable	
	mottles: gray many distinct @ 19"- continuous throughout	
	Groundwater Encountered @ 41"	**(Elev. 125.62)**
	Estimated Seasonal High Water Table- 19"	**(Elev. 127.43)**
	Sidewalls kept caving	

Test Pit #17	**Elevation 130.07**	
Depth	**Description**	
0"-4"	Topsoil	
4"-71"	saturated yellowish brown fine to very fine Sand /Loamy Sand	
	mottles: red bands many distinct @ 25"- continuous throughout	
71"-94"	saturated red medium to fine Sand / Loamy Sand; sub-angular blocky, friable	
	Groundwater Encountered @ 51"	**(Elev. 125.82)**
	Estimated Seasonal High Water Table- 26"	**(Elev. 127.90)**

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #1
Voorhees, NJ 08043	Monroe Twp	Horizon = 38"-104"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 38"-104"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 148.42
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.71

6. Standpipe Used: x No ____ Yes
Indicate Internal Radius, cm ____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	11.50	11.83
0.00	11.58	11.97
0.00	12.28	12.46

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 12.46 x ln(3/2)

k= 5.86

10. Defects in the Sample (Check appropriate items):
x None ____ Cracks ____ Worm Channels ____ Root Channels
____ Soil/Tube Contact ____ Large Gravel ____ Large Roots
____ Dry Soil ____ Smearing ____ Compactation
____ Other---Specify____

11. I hereby certify that the information furnished on form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water and Pollution Control Act (N.J.S.A. 58:10A-1 et seq) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #1
Voorhees, NJ 08043	Monroe Twp	Horizon = 38"-104"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 38"-104"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 149.78
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.72

6. Standpipe Used: ___x___ No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	12.27	12.46
0.00	12.39	12.65
0.00	12.42	12.70

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 12.70 x ln(3/2)

k= 5.75

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

11. I hereby certify that the information furnished on form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water and Pollution Control Act (N.J.S.A. 58:10A-1 et seq) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #2
Voorhees, NJ 08043	Monroe Twp	Horizon = 65"-124"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 65"-124"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 151.89
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.75

6. Standpipe Used: ___x___ No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	5.15	5.26
0.00	5.24	5.41
0.00	5.54	5.90

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 5.90 x ln(3/2)

k= 12.37

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC P.O. Box 1406 Voorhees, NJ 08043	JSA Blaze Mill Subdivison Monroe Twp	Sample Date 3/25/14 Test Pit #2 Horizon = 65"-124"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 65"-124"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 145.68
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.68

6. Standpipe Used: __x__ No ____ Yes
   Indicate Internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in Inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	5.39	5.65
0.00	5.53	5.88
0.00	5.56	5.93

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 5.93 x ln(3/2)

k= 12.31

10. Defects in the Sample (Check appropriate items):
__x__ None ____ Cracks ____ Worm Channels ____ Root Channels
____ Soil/Tube Contact ____ Large Gravel ____ Large Roots
____ Dry Soil ____ Smeering ____ Compactation
____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #3
Voorhees, NJ 08043	Monroe Twp	Horizon = 55"-128"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 55"-128"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 148.93
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.72

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	6.06	6.10
0.00	6.35	6.59
0.00	6.53	6.88

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 6.88 x ln(3/2)

k= 10.62

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #3
Voorhees, NJ 08043	Monroe Twp	Horizon = 55"-128"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 55"-128"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 147.04
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.69

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	6.22	6.37
0.00	6.33	6.56
0.00	6.53	6.89

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr	x ---------/--------- x 3/	6.89	x ln(3/2)
k= 10.60			

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #4
Voorhees, NJ 08043	Monroe Twp	Horizon = 42"-108"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 42"-108"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 146.48
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.69

6. Standpipe Used: ___x___ No _____ Yes
   Indicate Internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.25	3.42
0.00	3.41	3.68
0.00	3.51	3.85

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.85 x ln(3/2)

k= 18.95

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #4
Voorhees, NJ 08043	Monroe Twp	Horizon = 42"-108"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 42"-108"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 152.13
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.75

6. Standpipe Used: ___x___ No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.19	3.32
0.00	3.43	3.72
0.00	3.52	3.86

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.86 x ln(3/2)

k= 18.91

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #5
Voorhees, NJ 08043	Monroe Twp	Horizon = 0"-80"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 0"-80"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 152.16
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.75

6. Standpipe Used: ___x___ No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.41	3.69
0.00	4.04	4.07
0.00	4.07	4.12

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 4.12 x ln(3/2)

k= 17.73

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #5
Voorhees, NJ 08043	Monroe Twp	Horizon = 0"-80"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 0"-80"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 150.76
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.74

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.57	3.95
0.00	4.03	4.05
0.00	4.08	4.14

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 4.14 x ln(3/2)

k= 17.65

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #6
Voorhees, NJ 08043	Monroe Twp	Horizon = 11"-86"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 11"-86"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 150.59
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.73

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.11	3.18
0.00	3.26	3.44
0.00	3.30	3.50

9. Calculation of Permeability:

K_s (in/hr) = 60 min/hr x r^2/R^2 x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.50 x ln(3/2)

k= 20.87

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #6
Voorhees, NJ 08043	Monroe Twp	Horizon = 11"-86"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 11"-86"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 146.98
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.69

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.16	3.27
0.00	3.25	3.42
0.00	3.32	3.53

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.53 x ln(3/2)

k= 20.70

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #7
Voorhees, NJ 08043	Monroe Twp	Horizon = 12"-92"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 12"-92"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 146.05
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.68

6. Standpipe Used: ___x___ No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.13	3.22
0.00	3.28	3.47
0.00	3.33	3.55

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.55 x ln(3/2)

k= 20.55

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #7
Voorhees, NJ 08043	Monroe Twp	Horizon = 12"-92"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 12"-92"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 149.84
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.73

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.11	3.18
0.00	3.13	3.21
0.00	3.34	3.56

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.56 x ln(3/2)

k= 20.48

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #8
Voorhees, NJ 08043	Monroe Twp	Horizon = 12"-91"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 12"-91"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 152.08
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.75

6. Standpipe Used: ___x___ No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.21	3.35
0.00	3.22	3.37
0.00	3.36	3.60

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.60 x ln(3/2)

k= 20.29

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #8
Voorhees, NJ 08043	Monroe Twp	Horizon = 12"-91"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 12"-91"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 145.27
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.67

6. Standpipe Used: x No ____ Yes
   Indicate internal Radius, cm ____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.14	3.24
0.00	3.20	3.33
0.00	3.37	3.62

9. Calculation of Permeability:

K_1 (in/hr) = 60 min/hr x r^2/R^2 x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.62 x ln(3/2)

k= 20.15

10. Defects in the Sample (Check appropriate items):
x None ____ Cracks ____ Worm Channels ____ Root Channels
____ Soil/Tube Contact ____ Large Gravel ____ Large Roots
____ Dry Soil ____ Smeering ____ Compactation
____ Other---Specify ____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #9
Voorhees, NJ 08043	Monroe Twp	Horizon = 17"-108"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 17"-108"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 148.68
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.71

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.21	3.35
0.00	3.29	3.48
0.00	3.34	3.57

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.57 x ln(3/2)

k= 20.44

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #9
Voorhees, NJ 08043	Monroe Twp	Horizon = 17"-108"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 17"-108"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 148.66
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.71

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in Inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.22	3.37
0.00	3.31	3.51
0.00	3.35	3.58

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.58 x ln(3/2)

k= 20.38

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #10
Voorhees, NJ 08043	Monroe Twp	Horizon = 18"-104"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 18"-104"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 151.60
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.75

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	5.23	5.38
0.00	5.44	5.74
0.00	5.46	5.77

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 5.77 x ln(3/2)

k= 12.65

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #10
Voorhees, NJ 08043	Monroe Twp	Horizon = 18"-104"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 18"-104"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 150.03
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.73

6. Standpipe Used: ___x___ No _____ Yes
   Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	5.22	5.37
0.00	5.36	5.60
0.00	5.48	5.81

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 5.81 x ln(3/2)

k= 12.57

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #11
Voorhees, NJ 08043	Monroe Twp	Horizon = 26"-104"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 26"-104"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 151.75
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.75

6. Standpipe Used: ___x___ No _____ Yes
Indicate Internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	4.23	4.38
0.00	4.40	4.66
0.00	4.47	4.78

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 4.78 x ln(3/2)

k= 15.27

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #13
Voorhees, NJ 08043	Monroe Twp	Horizon = 41"-120"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 41"-120"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 148.42
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.71

6. Standpipe Used: ___x___ No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.49	3.82
0.00	3.57	3.95
0.00	3.59	3.98

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.98 x ln(3/2)

k= 18.32

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #13
Voorhees, NJ 08043	Monroe Twp	Horizon = 41"-120"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 41"-120"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 146.57
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.69

6. Standpipe Used: x No ____ Yes
   Indicate internal Radius, cm ____

7. Height of water Level above Rim of Test Basin in Inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.41	3.68
0.00	3.57	3.96
0.00	3.60	3.99

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x --------/-------- x 3/ 3.99 x ln(3/2)

k= 18.27

10. Defects in the Sample (Check appropriate items):
   x None ____ Cracks ____ Worm Channels ____ Root Channels
   ____ Soil/Tube Contact ____ Large Gravel ____ Large Roots
   ____ Dry Soil ____ Smeering ____ Compactation
   ____ Other---Specify ____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #14
Voorhees, NJ 08043	Monroe Twp	Horizon = 40"-111"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: [ ] Fill [X] Test in Native Soil - Indicate Depth: 40"-111"

3. Type of Sample: [ ] Undisturbed [X] Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
   Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
   Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 149.36
   Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
   Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.72

6. Standpipe Used: ___x___ No _____ Yes
   Indicate Internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in Inches:
   At the Beginning of Each Test Interval, H1: 3.0
   At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.29	3.48
0.00	3.32	3.54
0.00	3.41	3.69

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.69 x ln(3/2)

k= 19.80

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #14
Voorhees, NJ 08043	Monroe Twp	Horizon = 40"-111"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: Fill: X Test in Native Soil - Indicate Depth: 40"-111"

3. Type of Sample: Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 148.81
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.71

6. Standpipe Used: x No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.30	3.49
0.00	3.34	3.57
0.00	3.46	3.77

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.77 x ln(3/2)

k= 19.38

10. Defects in the Sample (Check appropriate items):
x None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #16
Voorhees, NJ 08043	Monroe Twp	Horizon = 19"-86"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 19"-86"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 151.79
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.75

6. Standpipe Used: ___x___ No _____ Yes
Indicate internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in Inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.45	3.75
0.00	4.01	4.01
0.00	4.07	4.11

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x --------/--------- x 3/ 4.11 x ln(3/2)

k= 17.75

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

11. I hereby certify that the information furnished on form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water and Pollution Control Act (N.J.S.A. 58:10A-1 et seq) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #16
Voorhees, NJ 08043	Monroe Twp	Horizon = 19"-86"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 19"-86"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 146.92
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.69

6. Standpipe Used: ___x___ No ____ Yes
Indicate internal Radius, cm ____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.53	3.89
0.00	3.60	3.99
0.00	4.08	4.13

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 4.13 x ln(3/2)

k= 17.69

10. Defects in the Sample (Check appropriate items):
___x___ None ____Cracks ____Worm Channels ____Root Channels
____ Soil/Tube Contact ____Large Gravel ____Large Roots
____ Dry Soil ____Smeering ____Compactation
____ Other---Specify____

11. I hereby certify that the information furnished on form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water and Pollution Control Act (N.J.S.A. 58:10A-1 et seq) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #17
Voorhees, NJ 08043	Monroe Twp	Horizon = 4"-71"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: A Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 4"-71"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 151.71
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.75

6. Standpipe Used: ___x___ No _____ Yes
Indicate Internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.43	3.72
0.00	3.45	3.75
0.00	3.58	3.97

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 3.97 x ln(3/2)

k= 18.38

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

11. I hereby certify that the information furnished on form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water and Pollution Control Act (N.J.S.A. 58:10A-1 et seq) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

South Jersey Engineers LLC	JSA	Sample Date 3/25/14
P.O. Box 1406	Blaze Mill Subdivison	Test Pit #17
Voorhees, NJ 08043	Monroe Twp	Horizon = 4"-71"

MUNICIPALITY: Monroe Twp

Form 3b. Tube Permeameter Test Data

1. Test Number: 1 Replicate Letter: B Date Collected: 3/25/2014

2. Material Tested: ____ Fill: X Test in Native Soil - Indicate Depth: 4"-71"

3. Type of Sample: ____ Undisturbed: X Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm: 1.905
Length of Sample, in inches: 3

5. Bulk Density Determination (Disturbed Samples Only):
Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube: 151.39
Sample Volume (L x 2.54 cm/inch x 3.14R²), cc: 86.83
Bulk Density (Sample Wt./Sample Volume), grams/cc: 1.74

6. Standpipe Used: ___x___ No _____ Yes
Indicate Internal Radius, cm _____

7. Height of water Level above Rim of Test Basin in inches:
At the Beginning of Each Test Interval, H1: 3.0
At the End of Each Test Interval, H2: 2.0

8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1 (min.sec)	Time, Start of Test Interval, T1 (min.sec)	Length of Test Interval, T, (min)
0.00	3.46	3.76
0.00	3.53	3.89
0.00	4.00	4.00

9. Calculation of Permeability:

K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2)

k= 60 min/hr x ---------/--------- x 3/ 4.00 x ln(3/2)

k= 18.24

10. Defects in the Sample (Check appropriate items):
___x___ None _____Cracks _____Worm Channels _____Root Channels
_____ Soil/Tube Contact _____Large Gravel _____Large Roots
_____ Dry Soil _____Smeering _____Compactation
_____ Other---Specify_____

11. I hereby certify that the information furnished on form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water and Pollution Control Act (N.J.S.A. 58:10A-1 et seq) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

SECTION "D"

DRAINAGE AREA PLANS

- PRE-DEVELOPMENT DRAINAGE AREA PLAN
- DRAINAGE AREA PLAN FOR STORM SEWER
- DRAINAGE AREA PLAN FOR STORMWATER MANAGEMENT