TECHNICAL REPORT

STORMWATER MANAGEMENT REPORT

TAKE 5 EXPRESS CAR WASH
BLOCK 2201, LOT 20
TOWNSHIP OF LAWRENCE
MERCER COUNTY, NEW JERSEY

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1.0 INTRODUCTION

Pennoni Associates, Inc., has been retained by Driven Brands to provide preliminary/final design for a Take 5 Express Car Wash in Lawrence Township, Mercer County, New Jersey. The improvements include a complete raze of an existing Dollar Tree building and site improvements, with construction of new pay stations, vacuum stalls, parking, landscaping, and lighting for the new car wash facility.

2.0 PROJECT DESCRIPTION

LOCATION

The property is located at 2520 Brunswick Pike (US Route 1 Business) adjacent to the jughandle to Texas Avenue in Lawrence Township, New Jersey. The property can be found on the United States Geological Survey (USGS) 7.5- minute topographic quadrangle for Princeton, New Jersey. A copy of the USGS map is provided as Figure 1. The property consists of Block 2201, Lot 20. A copy of the Township tax map is provided as Figure 2.

PRE-DEVELOPED CONDITIONS

The site presently consists of a vacant Dollar Tree store with a paved parking area, lighting, and landscaping. There are currently no stormwater management facilities onsite.

The existing watershed area for this analysis is divided into three (3) sub areas; Existing Drainage Area 1 (EDA-1), Existing Drainage Area 2 (EDA-2), and Existing Drainage Area 3 (EDA-3) (See Dwg. CS9001, Appendix D). The site as analyzed under pre-developed conditions does not contain any stormwater management facilities. The pre-developed calculations were analyzed to three (3) "points of interest" (POI). Pre-developed runoff hydrographs are located within Appendix A.

Existing Drainage Area 1 (EDA-1) consists of the southern half of the existing building and a large portion of the parking area, driveway, and small grass area adjacent to the existing residential properties at the southeastern side of the site. The runoff flows through the parking area in an easterly direction towards the adjacent property on Block 2201 Lot 21 (POI-1).

Existing Drainage Area 2 (EDA-2) consists of the small existing paved alley way between the onsite building and the adjacent building on Block 2201, Lot 17.02. Stormwater runoff flows overland in a southeasterly direction towards an existing inlet structure located between the two existing buildings (POI-2).

Existing Drainage Area 3 (EDA-3) consists of the northern half of the existing building and the parking area and driveway on the northwestern side of the site. This drainage area also includes the existing grassed area adjacent to the jughandle. Stormwater runoff flows overland to an

existing inlet on Block 2201, Lot 21 (POI-3). The inlet discharges to a 6" TC pipe that flows in a southeastern direction.

PROPOSED CONDITIONS

The proposed watershed area for this analysis is divided into three (3) sub areas, Proposed Drainage Area 1 (PDA-1), Proposed Drainage Area (PDA-2), and Proposed Drainage Area (PDA-3) (See Dwg. CS9002, Appendix D). The site was designed to keep the sub areas for the post design very similar to the existing conditions. The site as analyzed under post-developed conditions contains no stormwater management facilities. The post-developed calculations were analyzed to the same three (3) "points of interest" (P.O.I.) (See Post-Developed Hydrographs, Appendix B), as identified for the existing conditions runoff.

Proposed Drainage Area 1 (PDA-1) consists of the car wash roof area, approximately one half of the parking area and pay station drive aisles, and the proposed grassed area on the southeastern side of the site. The runoff flows through the paved area in an easterly direction towards the adjacent property on Block 2201, Lot 21 (POI-1).

Proposed Drainage Area 2 (PDA-2) consists of a strip of the grassed area adjacent to the drive through lanes on the southwesterly side of the site and the existing paved area off-site. Stormwater runoff flows overland in a southeasterly direction towards an existing inlet structure located between the two existing buildings (POI-2).

Proposed Drainage Area 3 (PDA-3) consists of the northwesterly portion of the parking lot and driveway and the existing grassed area on the west side of the site. Stormwater runoff flows overland in a southeasterly direction towards and existing inlet structure located on Block 2201, Lot 21 (POI-3).

Table 1 below summarizes the pre- vs. post-developed impervious areas onsite.

Table 1 - Project Area Comparison

	Non-Motor Vehicle Impervious Area (acre)	Motor Vehicle Surface Area (acre)	Pervious Area (acre)
Pre-Developed	0.34	0.57	0.17
Post-Developed	0.12	0.57	0.39
Difference	**-0.22**	**-0.00**	**+0.22**

3.0 SOILS

The Natural Resources Conservation Service (NRCS) Soil Survey was reviewed for the site. The soils in the location of the proposed site are Udorthents (UdstB), 0 to 8 percent slopes, with an NRCS interpretive soil group Type D soils. The NRCS Soil Survey map is provided as Figure 3.

4.0 REQUIREMENTS FOR STORMWATER MANAGEMENT

As required by N.J.A.C. 7:8-1.6, all "major development" shall comply with the requirements of N.J.A.C. 7:8 Stormwater Management Rules. A "Major development" means an individual "development," as well as multiple developments that individually or collectively result in:

1. The disturbance of one or more acres of land since February 2, 2004;

2. The creation of one-quarter acre or more of "regulated impervious surface" since February 2, 2004;

3. The creation of one-quarter acre or more of "regulated motor vehicle surface" since March 2, 2021; or

4. A combination of 2 and 3 above that totals an area of one-quarter acre or more. The same surface shall not be counted twice when determining if the combination area equals one-quarter acre or more.

Major development includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually meet any one or more of paragraphs 1, 2, 3, or 4 above. Projects undertaken by any government agency that otherwise meet the definition of "major development", but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

The stormwater management rules at N.J.A.C. 7:8, do not apply to the project site, as the site does not meet the definition for a major development based on the following:

1. **The site has not been disturbed by one acre or more since February 2, 2004. The total disturbance proposed for this project is 0.96 acres.**

2. **One-quarter acre or more of "regulated impervious surface" has not been created on the site since February 2, 2004. A review of historical aerial imagery indicates the site coverage remains unchanged since December 2002 (reference Figure 4). The "regulated impervious surface" will be decreased by 0.22 acres in the proposed conditions.**

3. **The project has not created one-quarter acre or more of "regulated motor vehicle surface" since March 2, 2021. The site has remained unchanged since at least December 2002. The "regulated motor vehicle surface" area will remain unchanged in the proposed conditions.**

5.0 TECHNIQUES OF ANALYSIS

In accordance with the stormwater runoff calculation methodology at N.J.A.C. 7:8-5.6, the quantity (volume and rate) of stormwater runoff for pre- and post-developed conditions is calculated based on the USDA NRCS methodology as described in NRCS National Engineering Handbook, Part 630.

Pre- and post-developed times of concentration (TC) are determined using the hydraulically longest flow path.

Curve numbers (CN) for the drainage areas are based on the hydrologic soil group and land use. The developed area is made up of Type D soils, therefore the following CN values were utilized:

Type D soils –Open Space 80, and Impervious 98

The impervious areas were calculated as separate subareas to generate hydrographs without weighted CNs as outlined in the CMP N.J.A.C. 7:50-6.84(a) 6.i (2) and the BMP manual chapter 5.

Using the drainage areas, the TCs and CNs as input data, *Pond Pack V8i,* a hydrologic/hydraulic software program by Bentley, was utilized to generate the runoff rates and volumes.

6.0 KEY HYDROLOGIC PRINCIPALS

A 24-hour, NOAA _C (Region C) storm distribution was utilized with the following rainfall amounts, within Mercer County for each storm analyzed (reference Appendix C).

2 year	3.3 inches
10 year	5.0 inches
100 year	8.4 inches

7.0 PRE VS. POST DEVELOPED RUNOFF RATE AND VOLUME COMPARISON

The proposed site has been designed to reduce the peak runoff rates and volumes for the 2-, 10- and 100-year storm events. See Appendices A & B for pre- and post-construction hydrographs.

Table 2 below provides a comparison of the Pre-Developed and Post-Developed runoff to P.O.I.-1.

Table 2 – Pre-Developed Flow vs. Post-Developed Flow to POI-1

Storm (Year)	Pre-Developed Runoff (cfs)	Pre-Developed Runoff Volume (cf)	Post-Developed Routed Runoff (cfs)	Post-Developed Routed Runoff Volume (cf)	Runoff Rate Increase from Pre-Developed (cfs)	Runoff Volume Increase from Pre-Developed (cf)
2	1.61	6,471	1.43	5,594	-0.18	-877
10	2.48	10,146	2.35	9,239	-0.13	-907
100	4.17	17,351	4.16	16,590	-0.01	-761

The project will reduce the overall runoff rate and volume to the northeastern adjacent property (Block 2201, Lot 21).

Table 3 below provides a comparison of the Pre-Developed and Post-Developed runoff to P.O.I.-2.

Table 3 – Pre-Developed Flow vs. Post-Developed Flow to POI-2

Storm (Year)	Pre-Developed Runoff (cfs)	Pre-Developed Runoff Volume (cf)	Post-Developed Routed Runoff (cfs)	Post-Developed Routed Runoff Volume (cf)	Runoff Rate Increase from Pre-Developed (cfs)	Runoff Volume Increase from Pre-Developed (cf)
2	0.08	335	0.07	277	-0.01	-58
10	0.13	521	0.11	453	-0.02	-68
100	0.21	883	0.20	805	-0.01	-78

The project will reduce the overall runoff rate and volume to the southwestern adjacent property (Block 2201, Lot 17.02).

Table 4 below provides a comparison of the Pre-Developed and Post-Developed runoff to P.O.I.-3.

Table 4 – Pre-Developed Flow vs. Post-Developed Flow to POI-3

Storm (Year)	Pre-Developed Runoff (cfs)	Pre-Developed Runoff Volume (cf)	Post-Developed Routed Runoff (cfs)	Post-Developed Routed Runoff Volume (cf)	Runoff Rate Increase from Pre-Developed (cfs)	Runoff Volume Increase from Pre-Developed (cf)
2	1.08	4,276	1.00	3,941	-0.08	-335
10	1.74	6,929	1.61	6,409	-0.13	-520
100	3.02	12,230	2.81	11,347	-0.21	-883

The project will reduce the overall runoff rate and volume to the existing inlet location on Block 2201, Lot 21.

8.0 SOIL EROSION AND SEDIMENT CONTROL

The project will comply with the minimum design and performance standards for erosion control established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules. Anticipated BMP's to be included in the Soil Erosion and Sediment Control Plan will include soil erosion BMP's to be implemented during construction, including: minimizing the area of disturbance, placement of silt fencing around the limit of disturbance, temporary soil stockpiles surrounded with silt fencing, temporary vegetative cover standards, and an anti-tracking stabilized construction entrance (see Dwg. CS8001). The project will be submitted to the Mercer County Soil Conservation District for certification of a Soil Erosion and Sediment Control Plan prior to commencement of construction.

9.0 CONCLUSION

A summary of the stormwater management design is as follows:

1. The stormwater management rules at N.J.A.C. 7:8, do not apply to the project site, as the site does not meet the definition for a major development based on the following:

    - The site has not been disturbed by one acre or more since February 2, 2004. The total area of the site disturbance for the proposed project is 0.96 acres.

    - One-quarter acre or more of “regulated impervious surface” has not been created

on the site since February 2, 2004. A review of historical aerial imagery indicates the site coverage remains unchanged since prior to December 2002 (reference Figure 4). The "regulated impervious surface" will be decreased by 0.22 acres in the proposed condition.

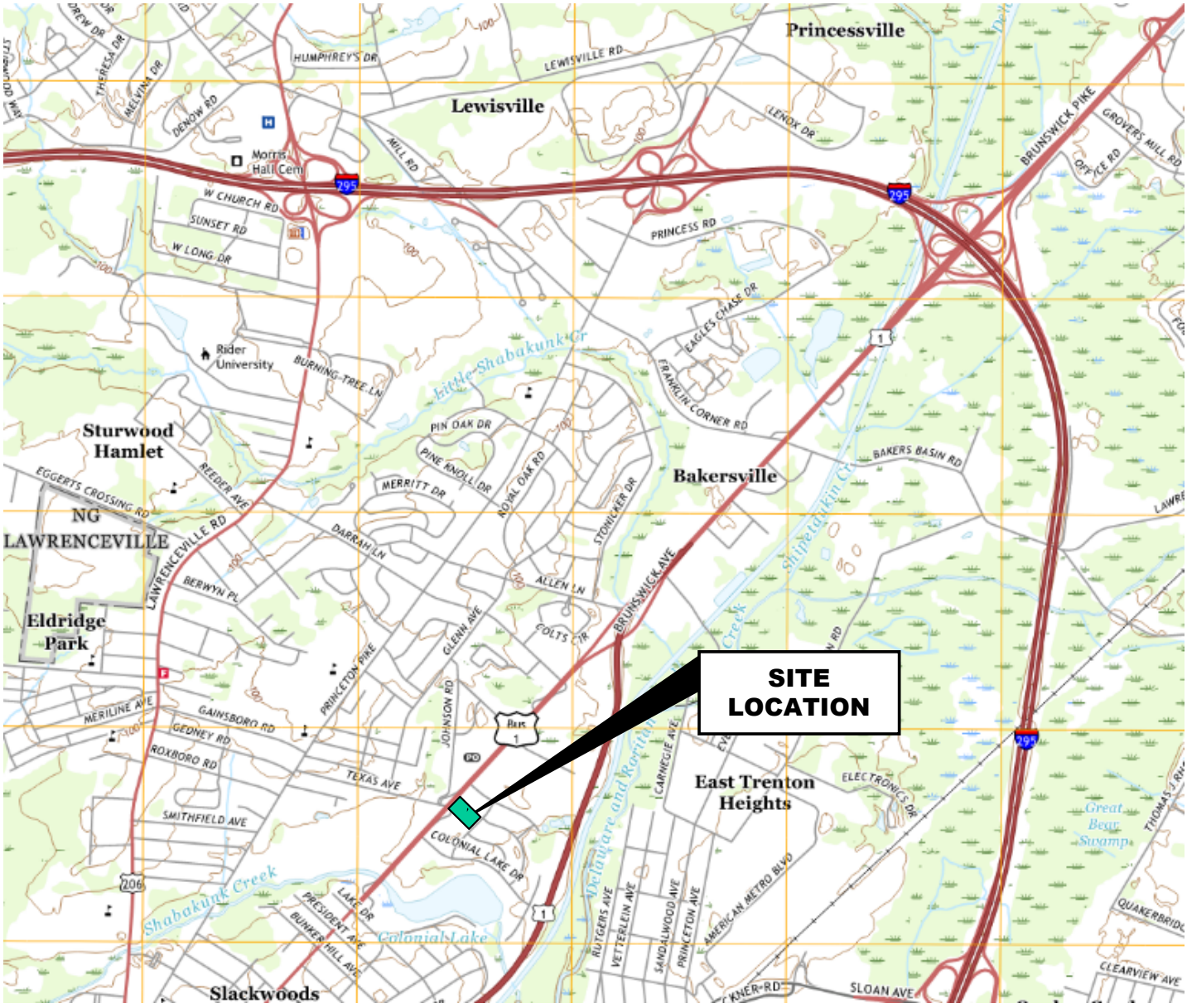
- The project has not created one-quarter acre or more of "regulated impervious surface" since March 2, 2021. The site has remained unchanged since at least December 2002. The "regulated motor vehicle surface" area will remain unchanged in the proposed conditions.

Thus, the current BMP standards for water quality and recharge do not apply. The current peak flow reduction standards also do not apply.

2. The project reduces impervious cover by approximately 0.22 acres.

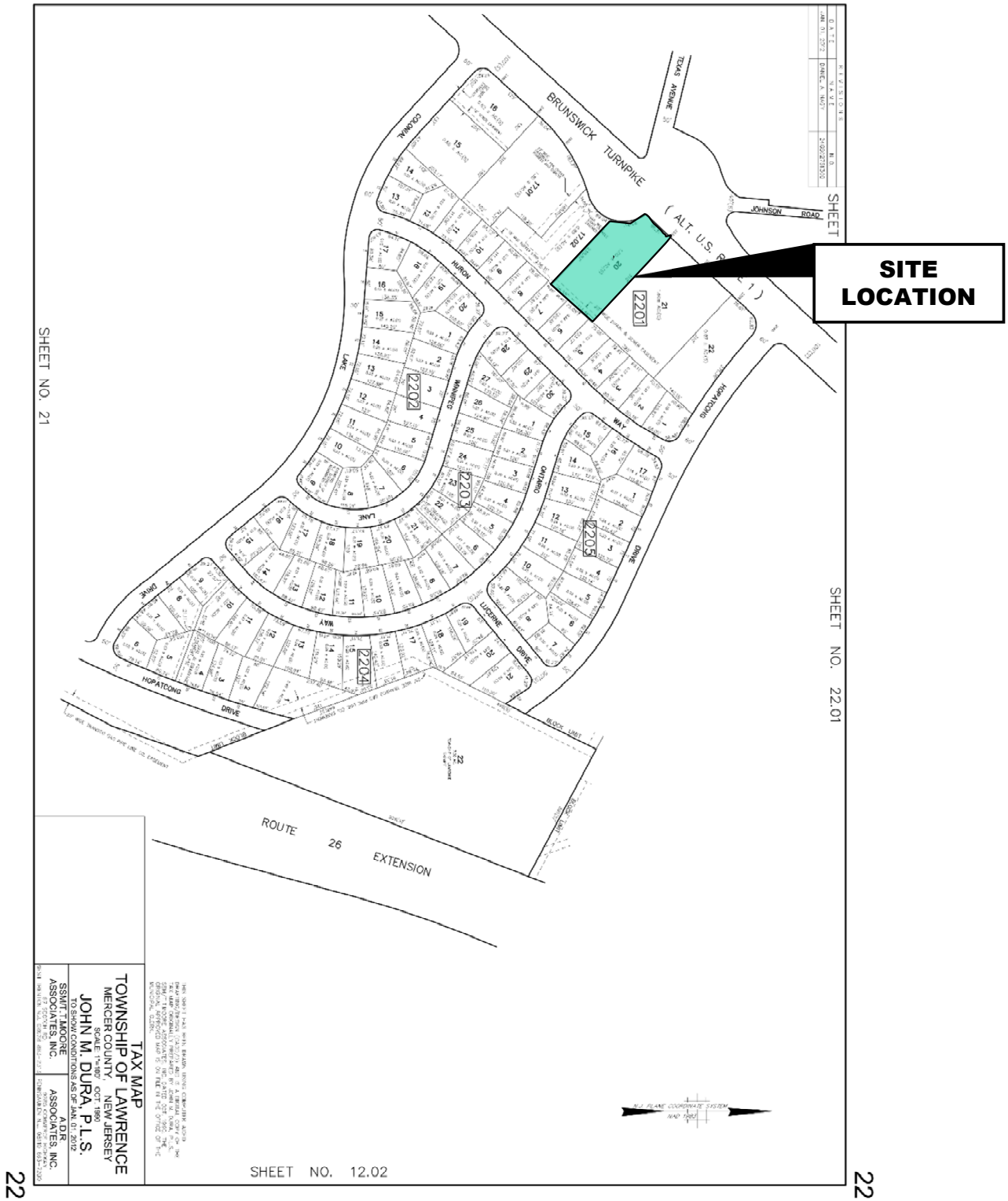
3. The site has been designed to reduce the runoff rate and volume to all three analyzed points of interest for the 2-, 10- and 100-year storm events.

Exhibits



USGS Map, US Route 1 Business, 2520 Brunswick Pike, Lawrence Township, NJ

PENNONI ASSOCIATES INC. 515 GROVE STREET, STE 1B HADDON HEIGHTS, NEW JERSEY 08035	Take 5 Express Car Wash BLOCK 2201, LOT 20 LAWRENCE TOWNSHIP, MERCER COUNTY NEW JERSEY	
Job No. DRVBR22047 / Scale: NTS	Figure 1: USGS Location Map	

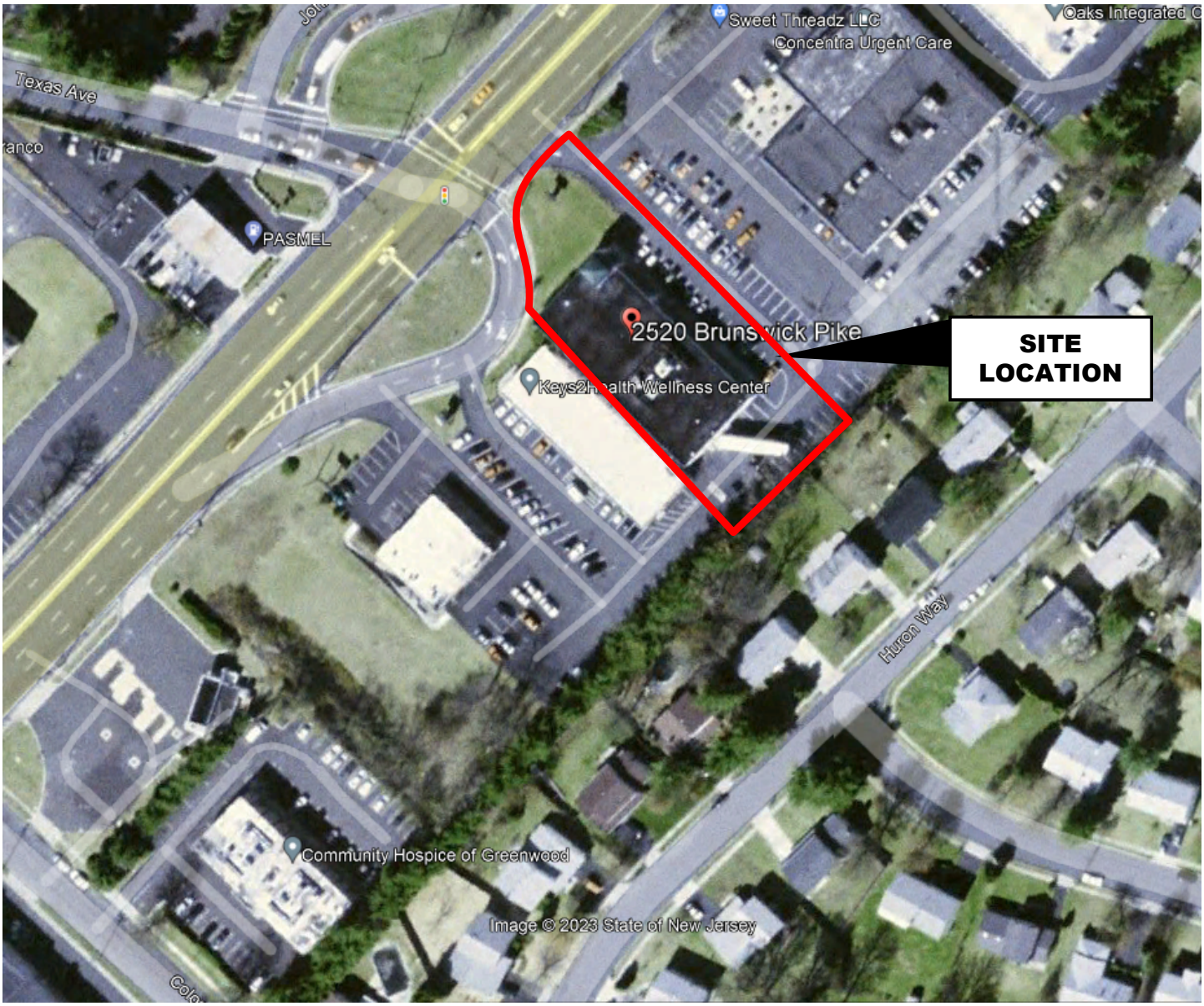


Tax Map, US Route 1 Business, 2520 Brunswick Pike, Lawrence Township, NJ

PENNONI ASSOCIATES INC. 515 GROVE STREET, STE 1b HADDON HEIGHTS, NEW JERSEY 08035		Take 5 Express Car Wash BLOCK 2201, LOT 20 LAWRENCE TOWNSHIP, MERCER COUNTY NEW JERSEY
Job No. DRVBR22047	Scale: NTS	Figure 2: Tax Map

Soils Map, US Route 1 Business, 2520 Brunswick Pike, Lawrence Township, NJ

Pennoni PENNONI ASSOCIATES INC. 515 GROVE STREET, STE 1B HADDON HEIGHTS, NEW JERSEY 08035		Take 5 Express Car Wash BLOCK 2201, LOT 20 LAWRENCE TOWNSHIP, MERCER COUNTY NEW JERSEY
Job No. DRVBR22047	Scale: NTS	Figure 3: Soils Map



2002 Historical Aerial Imagery, US Route 1 Business, 2520 Brunswick Pike, Lawrence Township, NJ

Pennoni PENNONI ASSOCIATES INC. 515 GROVE STREET, STE 1B HADDON HEIGHTS, NEW JERSEY 08035		Take 5 Express Car Wash BLOCK 2201, LOT 20 LAWRENCE TOWNSHIP, MERCER COUNTY NEW JERSEY
Job No. DRVBR22047	Scale: NTS	Figure 4: 2002 Historical Aerial Imagery

Appendix A

FlexTable: Catchment Table (2023-04-21-Pre-Post Developed.ppc)

Current Time: 0.000 hours

Label	Outflow Node	Area (acres)	SCS CN (Composite)	Time of Concentration (Composite) (hours)
EDA-1 Imp	EDA POI-1	0.560	98.000	0.083
EDA-1 Perv	EDA POI-1	0.040	80.000	0.083
EDA-2 Imp	EDA POI-2	0.030	98.000	0.083
PDA-2 Perv	PDA POI-2	0.010	80.000	0.083
PDA-1 Imp	PDA POI-1	0.380	98.000	0.083
PDA-1 Perv	PDA POI-1	0.250	80.000	0.083
PDA-2 Imp	PDA POI-2	0.020	98.000	0.083
EDA-3-Perv	EDA POI-3	0.130	80.000	0.083
EDA-3-Imp	EDA POI-3	0.320	98.000	0.083
PDA-3 Perv	PDA POI 3	0.130	80.000	0.083
PDA-3 Imp	PDA POI 3	0.290	98.000	0.083

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Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
EDA-1 Imp	2	2	6,255.000	12.100	1.54
EDA-1 Imp	10	10	9,723.000	12.100	2.36
EDA-1 Imp	100	100	16,486.000	12.100	3.93
EDA-1 Perv	2	2	216.000	12.100	0.06
EDA-1 Perv	10	10	423.000	12.100	0.12
EDA-1 Perv	100	100	864.000	12.100	0.24
EDA-2 Imp	2	2	335.000	12.100	0.08
EDA-2 Imp	10	10	521.000	12.100	0.13
EDA-2 Imp	100	100	883.000	12.100	0.21
PDA-2 Perv	2	2	54.000	12.100	0.02
PDA-2 Perv	10	10	106.000	12.100	0.03
PDA-2 Perv	100	100	216.000	12.100	0.06
PDA-1 Imp	2	2	4,245.000	12.100	1.05
PDA-1 Imp	10	10	6,598.000	12.100	1.60
PDA-1 Imp	100	100	11,187.000	12.100	2.67
PDA-1 Perv	2	2	1,349.000	12.100	0.39
PDA-1 Perv	10	10	2,641.000	12.100	0.75
PDA-1 Perv	100	100	5,403.000	12.100	1.49
PDA-2 Imp	2	2	223.000	12.100	0.06
PDA-2 Imp	10	10	347.000	12.100	0.08
PDA-2 Imp	100	100	589.000	12.100	0.14
EDA-3-Perv	2	2	702.000	12.100	0.20
EDA-3-Perv	10	10	1,373.000	12.100	0.39
EDA-3-Perv	100	100	2,810.000	12.100	0.78
EDA-3-Imp	2	2	3,574.000	12.100	0.88
EDA-3-Imp	10	10	5,556.000	12.100	1.35
EDA-3-Imp	100	100	9,421.000	12.100	2.25
PDA-3 Perv	2	2	702.000	12.100	0.20
PDA-3 Perv	10	10	1,373.000	12.100	0.39
PDA-3 Perv	100	100	2,810.000	12.100	0.78
PDA-3 Imp	2	2	3,239.000	12.100	0.80
PDA-3 Imp	10	10	5,035.000	12.100	1.22
PDA-3 Imp	100	100	8,537.000	12.100	2.04

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
EDA POI-1	2	2	6,471.000	12.100	1.61
EDA POI-1	10	10	10,146.000	12.100	2.48
EDA POI-1	100	100	17,351.000	12.100	4.17
EDA POI-2	2	2	335.000	12.100	0.08
EDA POI-2	10	10	521.000	12.100	0.13
EDA POI-2	100	100	883.000	12.100	0.21
PDA POI-2	2	2	277.000	12.100	0.07
PDA POI-2	10	10	453.000	12.100	0.11
PDA POI-2	100	100	805.000	12.100	0.20

PRE-DEVELOPED
Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
PDA POI-1	2	2	5,594.000	12.100	1.43
PDA POI-1	10	10	9,239.000	12.100	2.35
PDA POI-1	100	100	16,590.000	12.100	4.16
EDA POI-3	2	2	4,276.000	12.100	1.08
EDA POI-3	10	10	6,929.000	12.100	1.74
EDA POI-3	100	100	12,230.000	12.100	3.02
PDA POI 3	2	2	3,941.000	12.100	1.00
PDA POI 3	10	10	6,409.000	12.100	1.61
PDA POI 3	100	100	11,347.000	12.100	2.81

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.015
Slope	0.015 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	0.97 ft/s
Segment Time of Concentration	0.029 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	92.00 ft
Is Paved?	True
Slope	0.015 ft/ft
Average Velocity	2.49 ft/s
Segment Time of Concentration	0.010 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

PRE-DEVELOPED

Subsection: Time of Concentration Calculations
Label: EDA-1 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.030
Slope	0.013 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	0.53 ft/s
Segment Time of Concentration	0.053 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	50.00 ft
Is Paved?	True
Slope	0.015 ft/ft
Average Velocity	2.49 ft/s
Segment Time of Concentration	0.006 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

PRE-DEVELOPED

Subsection: Time of Concentration Calculations
Label: EDA-1 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	37.00 ft
Manning's n	0.150
Slope	0.050 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	0.20 ft/s
Segment Time of Concentration	0.050 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	104.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.010 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

PRE-DEVELOPED

Subsection: Time of Concentration Calculations
Label: EDA-2 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.030
Slope	0.013 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	0.53 ft/s
Segment Time of Concentration	0.053 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	100.00 ft
Is Paved?	True
Slope	0.013 ft/ft
Average Velocity	2.32 ft/s
Segment Time of Concentration	0.012 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

PRE-DEVELOPED

Subsection: Time of Concentration Calculations
Label: EDA-3-Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.030
Slope	0.013 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	0.53 ft/s
Segment Time of Concentration	0.053 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	200.00 ft
Is Paved?	True
Slope	0.013 ft/ft
Average Velocity	2.32 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

PRE-DEVELOPED

Subsection: Time of Concentration Calculations
Label: EDA-3-Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.560 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	1.55 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.54 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.560 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	6,255.116 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	6,255.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.64 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-1 Imp
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.560 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	2.36 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.36 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.560 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	9,723.161 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	9,723.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.64 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-1 Imp
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.560 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	3.94 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	3.93 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.560 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.1 in
Runoff Volume (Pervious)	16,485.997 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	16,486.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.64 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-1 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.040 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.06 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.06 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.040 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	215.916 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	216.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.55 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-1 Perv
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.040 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.12 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.12 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.040 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.9 in
Runoff Volume (Pervious)	422.577 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	423.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.55 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-1 Perv
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.040 acres
Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.24 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.24 ft³/s
Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.040 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.0 in
Runoff Volume (Pervious)	864.501 ft³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	864.000 ft³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.55 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-1 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.030 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.08 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.08 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.030 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	335.095 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	335.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.41 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-2 Imp
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.030 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.13 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.13 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.030 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	520.884 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	521.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.41 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-2 Imp
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.030 acres
Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.21 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.21 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.030 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.1 in
Runoff Volume (Pervious)	883.178 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	883.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.41 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-2 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.88 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.88 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	3,574.352 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	3,574.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-3-Imp
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	1.35 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.35 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	5,556.092 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5,556.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-3-Imp
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres
Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	2.25 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.25 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.1 in
Runoff Volume (Pervious)	9,420.570 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	9,421.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-3-Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.130 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.20 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.20 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.130 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	701.727 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	702.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.77 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-3-Perv
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.130 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.39 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.39 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.130 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.9 in
Runoff Volume (Pervious)	1,373.377 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,373.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.77 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-3-Perv
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.130 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.78 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.78 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.130 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.0 in
Runoff Volume (Pervious)	2,809.629 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2,810.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.77 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

PRE-DEVELOPED

Subsection: Unit Hydrograph Summary
Label: EDA-3-Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

PRE-DEVELOPED

Subsection: Addition Summary
Label: EDA POI-1
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

Summary for Hydrograph Addition at 'EDA POI-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1 Imp
<Catchment to Outflow Node>	EDA-1 Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	EDA-1 Imp	6,255.132	12.100	1.54
Flow (From)	EDA-1 Perv	215.896	12.100	0.06
Flow (In)	EDA POI-1	6,471.028	12.100	1.61

PRE-DEVELOPED

Subsection: Addition Summary
Label: EDA POI-1
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

Summary for Hydrograph Addition at 'EDA POI-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1 Imp
<Catchment to Outflow Node>	EDA-1 Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	EDA-1 Imp	9,723.206	12.100	2.36
Flow (From)	EDA-1 Perv	422.552	12.100	0.12
Flow (In)	EDA POI-1	10,145.759	12.100	2.48

Subsection: Addition Summary
Label: EDA POI-1
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

Summary for Hydrograph Addition at 'EDA POI-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1 Imp
<Catchment to Outflow Node>	EDA-1 Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	EDA-1 Imp	16,486.091	12.100	3.93
Flow (From)	EDA-1 Perv	864.475	12.100	0.24
Flow (In)	EDA POI-1	17,350.566	12.100	4.17

Subsection: Addition Summary
Label: EDA POI-2
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

Summary for Hydrograph Addition at 'EDA POI-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-2 Imp

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	EDA-2 Imp	335.096	12.100	0.08
Flow (In)	EDA POI-2	335.096	12.100	0.08

Subsection: Addition Summary
Label: EDA POI-2
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

Summary for Hydrograph Addition at 'EDA POI-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-2 Imp

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-2 Imp	520.886	12.100	0.13
Flow (In)	EDA POI-2	520.886	12.100	0.13

Subsection: Addition Summary
Label: EDA POI-2
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

Summary for Hydrograph Addition at 'EDA POI-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-2 Imp

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-2 Imp	883.183	12.100	0.21
Flow (In)	EDA POI-2	883.183	12.100	0.21

PRE-DEVELOPED

Subsection: Addition Summary
Label: EDA POI-3
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

Summary for Hydrograph Addition at 'EDA POI-3'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-3-Imp
<Catchment to Outflow Node>	EDA-3-Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	EDA-3-Imp	3,574.361	12.100	0.88
Flow (From)	EDA-3-Perv	701.661	12.100	0.20
Flow (In)	EDA POI-3	4,276.022	12.100	1.08

PRE-DEVELOPED

Subsection: Addition Summary
Label: EDA POI-3
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

Summary for Hydrograph Addition at 'EDA POI-3'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-3-Imp
<Catchment to Outflow Node>	EDA-3-Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	EDA-3-Imp	5,556.118	12.100	1.35
Flow (From)	EDA-3-Perv	1,373.296	12.100	0.39
Flow (In)	EDA POI-3	6,929.413	12.100	1.74

Subsection: Addition Summary
Label: EDA POI-3
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

Summary for Hydrograph Addition at 'EDA POI-3'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-3-Imp
<Catchment to Outflow Node>	EDA-3-Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	EDA-3-Imp	9,420.624	12.100	2.25
Flow (From)	EDA-3-Perv	2,809.543	12.100	0.78
Flow (In)	EDA POI-3	12,230.166	12.100	3.02

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PRE-DEVELOPED

Appendix B

CURVE NUMBER

Label	Outflow Node	Area (acres)	SCS CN (Composite)	Time of Concentration (Composite) (hours)
EDA-1 Imp	EDA POI-1	0.560	98.000	0.083
EDA-1 Perv	EDA POI-1	0.040	80.000	0.083
EDA-2 Imp	EDA POI-2	0.030	98.000	0.083
PDA-2 Perv	PDA POI-2	0.010	80.000	0.083
PDA-1 Imp	PDA POI-1	0.380	98.000	0.083
PDA-1 Perv	PDA POI-1	0.250	80.000	0.083
PDA-2 Imp	PDA POI-2	0.020	98.000	0.083
EDA-3-Perv	EDA POI-3	0.130	80.000	0.083
EDA-3-Imp	EDA POI-3	0.320	98.000	0.083
PDA-3 Perv	PDA POI 3	0.130	80.000	0.083
PDA-3 Imp	PDA POI 3	0.290	98.000	0.083

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Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
EDA-1 Imp	2	2	6,255.000	12.100	1.54
EDA-1 Imp	10	10	9,723.000	12.100	2.36
EDA-1 Imp	100	100	16,486.000	12.100	3.93
EDA-1 Perv	2	2	216.000	12.100	0.06
EDA-1 Perv	10	10	423.000	12.100	0.12
EDA-1 Perv	100	100	864.000	12.100	0.24
EDA-2 Imp	2	2	335.000	12.100	0.08
EDA-2 Imp	10	10	521.000	12.100	0.13
EDA-2 Imp	100	100	883.000	12.100	0.21
PDA-2 Perv	2	2	54.000	12.100	0.02
PDA-2 Perv	10	10	106.000	12.100	0.03
PDA-2 Perv	100	100	216.000	12.100	0.06
PDA-1 Imp	2	2	4,245.000	12.100	1.05
PDA-1 Imp	10	10	6,598.000	12.100	1.60
PDA-1 Imp	100	100	11,187.000	12.100	2.67
PDA-1 Perv	2	2	1,349.000	12.100	0.39
PDA-1 Perv	10	10	2,641.000	12.100	0.75
PDA-1 Perv	100	100	5,403.000	12.100	1.49
PDA-2 Imp	2	2	223.000	12.100	0.06
PDA-2 Imp	10	10	347.000	12.100	0.08
PDA-2 Imp	100	100	589.000	12.100	0.14
EDA-3-Perv	2	2	702.000	12.100	0.20
EDA-3-Perv	10	10	1,373.000	12.100	0.39
EDA-3-Perv	100	100	2,810.000	12.100	0.78
EDA-3-Imp	2	2	3,574.000	12.100	0.88
EDA-3-Imp	10	10	5,556.000	12.100	1.35
EDA-3-Imp	100	100	9,421.000	12.100	2.25
PDA-3 Perv	2	2	702.000	12.100	0.20
PDA-3 Perv	10	10	1,373.000	12.100	0.39
PDA-3 Perv	100	100	2,810.000	12.100	0.78
PDA-3 Imp	2	2	3,239.000	12.100	0.80
PDA-3 Imp	10	10	5,035.000	12.100	1.22
PDA-3 Imp	100	100	8,537.000	12.100	2.04

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
EDA POI-1	2	2	6,471.000	12.100	1.61
EDA POI-1	10	10	10,146.000	12.100	2.48
EDA POI-1	100	100	17,351.000	12.100	4.17
EDA POI-2	2	2	335.000	12.100	0.08
EDA POI-2	10	10	521.000	12.100	0.13
EDA POI-2	100	100	883.000	12.100	0.21
PDA POI-2	2	2	277.000	12.100	0.07
PDA POI-2	10	10	453.000	12.100	0.11
PDA POI-2	100	100	805.000	12.100	0.20

POST DEVELOPED
Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
PDA POI-1	2	2	5,594.000	12.100	1.43
PDA POI-1	10	10	9,239.000	12.100	2.35
PDA POI-1	100	100	16,590.000	12.100	4.16
EDA POI-3	2	2	4,276.000	12.100	1.08
EDA POI-3	10	10	6,929.000	12.100	1.74
EDA POI-3	100	100	12,230.000	12.100	3.02
PDA POI 3	2	2	3,941.000	12.100	1.00
PDA POI 3	10	10	6,409.000	12.100	1.61
PDA POI 3	100	100	11,347.000	12.100	2.81

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.013
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	1.22 ft/s
Segment Time of Concentration	0.023 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	213.00 ft
Is Paved?	True
Slope	0.013 ft/ft
Average Velocity	2.32 ft/s
Segment Time of Concentration	0.026 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

POST DEVELOPED

Subsection: Time of Concentration Calculations
Label: PDA-1 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.013
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	1.20 ft/s
Segment Time of Concentration	0.023 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	213.00 ft
Is Paved?	True
Slope	0.133 ft/ft
Average Velocity	7.41 ft/s
Segment Time of Concentration	0.008 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

POST DEVELOPED

Subsection: Time of Concentration Calculations
Label: PDA-1 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.013
Slope	0.013 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	1.03 ft/s
Segment Time of Concentration	0.027 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	43.00 ft
Is Paved?	False
Slope	0.013 ft/ft
Average Velocity	1.84 ft/s
Segment Time of Concentration	0.006 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

POST DEVELOPED

Subsection: Time of Concentration Calculations
Label: PDA-2 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.013
Slope	0.013 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	1.03 ft/s
Segment Time of Concentration	0.027 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	43.00 ft
Is Paved?	False
Slope	0.013 ft/ft
Average Velocity	1.84 ft/s
Segment Time of Concentration	0.006 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

POST DEVELOPED

Subsection: Time of Concentration Calculations
Label: PDA-2 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.030
Slope	0.015 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	0.56 ft/s
Segment Time of Concentration	0.050 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	90.00 ft
Is Paved?	True
Slope	0.015 ft/ft
Average Velocity	2.49 ft/s
Segment Time of Concentration	0.010 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

POST DEVELOPED

Subsection: Time of Concentration Calculations
Label: PDA-3 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.030
Slope	0.015 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	0.56 ft/s
Segment Time of Concentration	0.050 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	90.00 ft
Is Paved?	True
Slope	0.015 ft/ft
Average Velocity	2.49 ft/s
Segment Time of Concentration	0.010 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

POST DEVELOPED

Subsection: Time of Concentration Calculations
Label: PDA-3 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.380 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	1.05 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.05 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.380 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	4,244.543 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	4,245.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.19 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-1 Imp
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.380 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	1.60 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.60 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.380 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	6,597.860 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	6,598.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.19 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-1 Imp
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.380 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	2.67 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.67 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.380 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.1 in
Runoff Volume (Pervious)	11,186.927 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	11,187.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.19 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-1 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.250 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.39 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.39 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.250 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	1,349.475 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,349.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.41 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-1 Perv
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.250 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.75 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.75 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.250 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.9 in
Runoff Volume (Pervious)	2,641.109 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2,641.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.41 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-1 Perv
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Subsection: Unit Hydrograph Summary
Label: PDA-1 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.250 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	1.49 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.49 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.250 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.0 in
Runoff Volume (Pervious)	5,403.132 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5,403.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.41 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-1 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.020 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.06 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.06 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.020 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	223.397 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	223.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.27 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-2 Imp
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.020 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.08 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.08 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.020 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	347.256 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	347.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.27 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-2 Imp
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.020 acres
Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.14 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.14 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.020 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.1 in
Runoff Volume (Pervious)	588.786 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	589.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.27 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-2 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.010 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.02 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.02 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.010 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	53.979 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	54.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.14 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-2 Perv
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.010 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.03 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.03 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.010 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.9 in
Runoff Volume (Pervious)	105.644 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	106.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.14 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-2 Perv
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.010 acres
Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.06 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.06 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.010 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.0 in
Runoff Volume (Pervious)	216.125 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	216.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.14 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-2 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.290 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.80 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.80 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.290 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	3,239.256 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	3,239.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.96 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-3 Imp
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.290 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	1.22 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.22 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.290 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	5,035.209 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5,035.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.96 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-3 Imp
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.290 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	2.04 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.04 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.290 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.1 in
Runoff Volume (Pervious)	8,537.392 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	8,537.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.96 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-3 Imp
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Storm Event	2 year
Return Event	2 years
Duration	48.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.130 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.20 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.20 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.130 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	701.727 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	702.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.77 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-3 Perv
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

SCS Unit Hydrograph Parameters

Storm Event	10 year
Return Event	10 years
Duration	48.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.130 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.39 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.39 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.130 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.9 in
Runoff Volume (Pervious)	1,373.377 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,373.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.77 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-3 Perv
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

SCS Unit Hydrograph Parameters

Storm Event	100 year
Return Event	100 years
Duration	48.000 hours
Depth	8.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.130 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.107 hours
Flow (Peak, Computed)	0.78 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.78 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.130 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.0 in
Runoff Volume (Pervious)	2,809.629 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2,810.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.77 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

POST DEVELOPED

Subsection: Unit Hydrograph Summary
Label: PDA-3 Perv
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

SCS Unit Hydrograph Parameters

Subsection: Addition Summary
Label: PDA POI 3
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

Summary for Hydrograph Addition at 'PDA POI 3'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-3 Perv
<Catchment to Outflow Node>	PDA-3 Imp

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-3 Perv	701.661	12.100	0.20
Flow (From)	PDA-3 Imp	3,239.265	12.100	0.80
Flow (In)	PDA POI 3	3,940.926	12.100	1.00

Subsection: Addition Summary
Label: PDA POI 3
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

Summary for Hydrograph Addition at 'PDA POI 3'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-3 Perv
<Catchment to Outflow Node>	PDA-3 Imp

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-3 Perv	1,373.296	12.100	0.39
Flow (From)	PDA-3 Imp	5,035.232	12.100	1.22
Flow (In)	PDA POI 3	6,408.527	12.100	1.61

Subsection: Addition Summary
Label: PDA POI 3
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

Summary for Hydrograph Addition at 'PDA POI 3'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-3 Perv
<Catchment to Outflow Node>	PDA-3 Imp

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-3 Perv	2,809.543	12.100	0.78
Flow (From)	PDA-3 Imp	8,537.440	12.100	2.04
Flow (In)	PDA POI 3	11,346.983	12.100	2.81

Subsection: Addition Summary
Label: PDA POI-1
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

Summary for Hydrograph Addition at 'PDA POI-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1 Perv
<Catchment to Outflow Node>	PDA-1 Imp

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-1 Perv	1,349.349	12.100	0.39
Flow (From)	PDA-1 Imp	4,244.554	12.100	1.05
Flow (In)	PDA POI-1	5,593.902	12.100	1.43

Subsection: Addition Summary
Label: PDA POI-1
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

Summary for Hydrograph Addition at 'PDA POI-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1 Perv
<Catchment to Outflow Node>	PDA-1 Imp

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-1 Perv	2,640.953	12.100	0.75
Flow (From)	PDA-1 Imp	6,597.890	12.100	1.60
Flow (In)	PDA POI-1	9,238.843	12.100	2.35

Subsection: Addition Summary
Label: PDA POI-1
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

Summary for Hydrograph Addition at 'PDA POI-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1 Perv
<Catchment to Outflow Node>	PDA-1 Imp

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-1 Perv	5,402.966	12.100	1.49
Flow (From)	PDA-1 Imp	11,186.991	12.100	2.67
Flow (In)	PDA POI-1	16,589.957	12.100	4.16

Subsection: Addition Summary
Label: PDA POI-2
Scenario: 2

Return Event: 2 years
Storm Event: 2 year

Summary for Hydrograph Addition at 'PDA POI-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2 Imp
<Catchment to Outflow Node>	PDA-2 Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-2 Imp	223.398	12.100	0.06
Flow (From)	PDA-2 Perv	53.974	12.100	0.02
Flow (In)	PDA POI-2	277.372	12.100	0.07

Subsection: Addition Summary
Label: PDA POI-2
Scenario: 10

Return Event: 10 years
Storm Event: 10 year

Summary for Hydrograph Addition at 'PDA POI-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2 Imp
<Catchment to Outflow Node>	PDA-2 Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-2 Imp	347.257	12.100	0.08
Flow (From)	PDA-2 Perv	105.638	12.100	0.03
Flow (In)	PDA POI-2	452.895	12.100	0.11

Subsection: Addition Summary
Label: PDA POI-2
Scenario: 100

Return Event: 100 years
Storm Event: 100 year

Summary for Hydrograph Addition at 'PDA POI-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2 Imp
<Catchment to Outflow Node>	PDA-2 Perv

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-2 Imp	588.789	12.100	0.14
Flow (From)	PDA-2 Perv	216.119	12.100	0.06
Flow (In)	PDA POI-2	804.908	12.100	0.20

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Appendix C

NOAA Atlas 14, Volume 2, Version 3
Location name: Trenton, New Jersey, USA*
Latitude: 40.2673°, Longitude: -74.7582°
Elevation: 94.13 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.341** (0.310-0.376)	**0.407** (0.370-0.449)	**0.484** (0.438-0.533)	**0.540** (0.488-0.595)	**0.609** (0.547-0.671)	**0.660** (0.590-0.727)	**0.710** (0.632-0.784)	**0.757** (0.670-0.839)	**0.816** (0.715-0.909)	**0.862** (0.748-0.965)
10-min	**0.545** (0.495-0.601)	**0.651** (0.591-0.718)	**0.775** (0.701-0.854)	**0.864** (0.780-0.951)	**0.971** (0.872-1.07)	**1.05** (0.940-1.16)	**1.13** (1.00-1.25)	**1.20** (1.06-1.33)	**1.29** (1.13-1.44)	**1.36** (1.18-1.52)
15-min	**0.681** (0.618-0.751)	**0.818** (0.743-0.902)	**0.981** (0.887-1.08)	**1.09** (0.987-1.20)	**1.23** (1.11-1.36)	**1.33** (1.19-1.47)	**1.43** (1.27-1.58)	**1.51** (1.34-1.68)	**1.63** (1.42-1.81)	**1.70** (1.48-1.91)
30-min	**0.934** (0.848-1.03)	**1.13** (1.03-1.25)	**1.39** (1.26-1.54)	**1.58** (1.43-1.74)	**1.82** (1.64-2.01)	**2.00** (1.79-2.21)	**2.18** (1.94-2.41)	**2.36** (2.09-2.61)	**2.59** (2.27-2.88)	**2.76** (2.39-3.09)
60-min	**1.16** (1.06-1.28)	**1.42** (1.29-1.56)	**1.79** (1.62-1.97)	**2.06** (1.86-2.27)	**2.43** (2.18-2.67)	**2.72** (2.43-2.99)	**3.01** (2.68-3.32)	**3.31** (2.93-3.66)	**3.71** (3.25-4.13)	**4.03** (3.50-4.51)
2-hr	**1.41** (1.28-1.56)	**1.72** (1.56-1.90)	**2.17** (1.97-2.40)	**2.53** (2.28-2.78)	**3.01** (2.70-3.31)	**3.40** (3.03-3.74)	**3.80** (3.36-4.19)	**4.21** (3.71-4.66)	**4.79** (4.16-5.33)	**5.24** (4.51-5.87)
3-hr	**1.55** (1.40-1.72)	**1.89** (1.71-2.10)	**2.39** (2.15-2.66)	**2.78** (2.50-3.09)	**3.34** (2.98-3.70)	**3.78** (3.36-4.20)	**4.25** (3.74-4.73)	**4.74** (4.14-5.28)	**5.42** (4.66-6.07)	**5.97** (5.08-6.73)
6-hr	**1.96** (1.77-2.19)	**2.38** (2.15-2.65)	**3.01** (2.71-3.35)	**3.52** (3.15-3.91)	**4.26** (3.78-4.73)	**4.87** (4.29-5.42)	**5.54** (4.83-6.17)	**6.25** (5.39-6.97)	**7.29** (6.17-8.17)	**8.15** (6.81-9.20)
12-hr	**2.37** (2.15-2.66)	**2.88** (2.60-3.23)	**3.66** (3.29-4.10)	**4.32** (3.87-4.83)	**5.32** (4.71-5.93)	**6.18** (5.43-6.90)	**7.12** (6.17-7.95)	**8.17** (6.97-9.15)	**9.74** (8.14-11.0)	**11.1** (9.10-12.6)
24-hr	**2.75** (2.54-3.00)	**3.32** (3.07-3.62)	**4.22** (3.89-4.60)	**4.98** (4.58-5.42)	**6.12** (5.57-6.64)	**7.09** (6.41-7.69)	**8.17** (7.31-8.86)	**9.35** (8.28-10.1)	**11.1** (9.68-12.1)	**12.6** (10.8-13.8)
2-day	**3.18** (2.93-3.48)	**3.85** (3.54-4.21)	**4.90** (4.50-5.36)	**5.77** (5.28-6.30)	**7.04** (6.39-7.67)	**8.12** (7.32-8.84)	**9.28** (8.31-10.1)	**10.6** (9.36-11.5)	**12.4** (10.9-13.6)	**14.0** (12.1-15.4)
3-day	**3.37** (3.11-3.67)	**4.07** (3.76-4.44)	**5.16** (4.75-5.62)	**6.04** (5.55-6.58)	**7.33** (6.69-7.96)	**8.41** (7.62-9.13)	**9.57** (8.62-10.4)	**10.8** (9.66-11.8)	**12.6** (11.2-13.8)	**14.2** (12.4-15.5)
4-day	**3.56** (3.29-3.87)	**4.30** (3.98-4.68)	**5.41** (5.00-5.88)	**6.32** (5.82-6.85)	**7.62** (6.98-8.25)	**8.70** (7.92-9.41)	**9.85** (8.92-10.7)	**11.1** (9.97-12.0)	**12.9** (11.4-14.0)	**14.3** (12.6-15.6)
7-day	**4.17** (3.86-4.54)	**5.01** (4.63-5.45)	**6.21** (5.73-6.76)	**7.21** (6.63-7.84)	**8.64** (7.91-9.38)	**9.82** (8.96-10.7)	**11.1** (10.0-12.0)	**12.4** (11.2-13.5)	**14.4** (12.8-15.6)	**16.0** (14.1-17.4)
10-day	**4.75** (4.42-5.14)	**5.68** (5.29-6.14)	**6.95** (6.45-7.50)	**7.97** (7.39-8.61)	**9.41** (8.69-10.1)	**10.6** (9.73-11.4)	**11.8** (10.8-12.7)	**13.1** (11.9-14.1)	**14.9** (13.4-16.1)	**16.3** (14.6-17.7)
20-day	**6.42** (6.03-6.84)	**7.62** (7.16-8.12)	**9.10** (8.54-9.70)	**10.3** (9.63-10.9)	**11.9** (11.1-12.6)	**13.1** (12.2-13.9)	**14.4** (13.3-15.3)	**15.6** (14.5-16.7)	**17.4** (15.9-18.5)	**18.7** (17.1-20.0)
30-day	**7.99** (7.56-8.45)	**9.43** (8.92-9.96)	**11.0** (10.4-11.6)	**12.3** (11.6-13.0)	**13.9** (13.1-14.7)	**15.1** (14.2-16.0)	**16.4** (15.3-17.3)	**17.6** (16.4-18.6)	**19.1** (17.8-20.3)	**20.3** (18.8-21.6)
45-day	**10.2** (9.68-10.7)	**12.0** (11.4-12.6)	**13.8** (13.1-14.5)	**15.2** (14.4-16.0)	**16.9** (16.0-17.8)	**18.3** (17.2-19.2)	**19.5** (18.4-20.5)	**20.7** (19.5-21.8)	**22.2** (20.8-23.4)	**23.3** (21.7-24.6)
60-day	**12.2** (11.6-12.8)	**14.3** (13.6-15.0)	**16.3** (15.6-17.1)	**17.9** (17.0-18.7)	**19.8** (18.8-20.7)	**21.2** (20.1-22.2)	**22.5** (21.3-23.6)	**23.7** (22.4-24.9)	**25.1** (23.7-26.5)	**26.2** (24.6-27.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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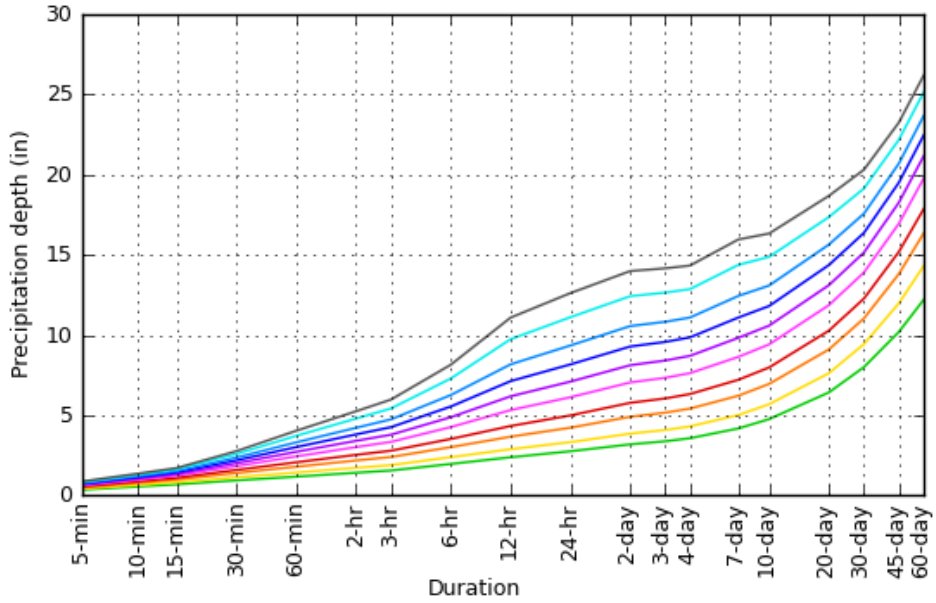
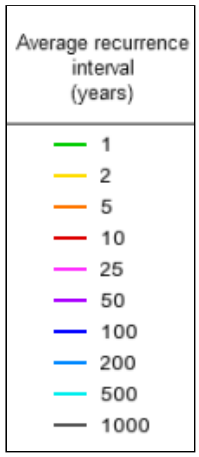
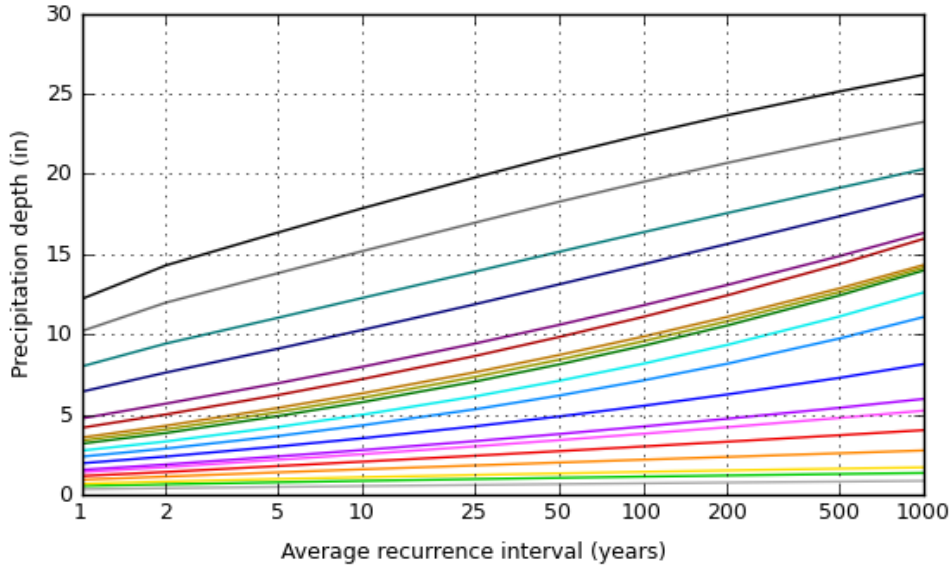
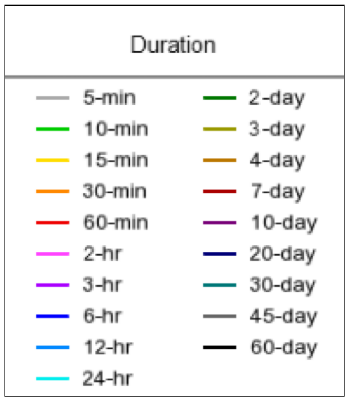
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.2673°, Longitude: -74.7582°









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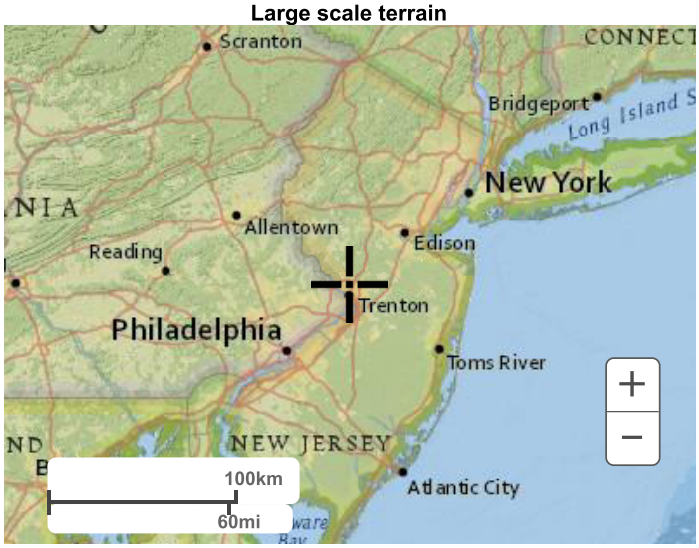
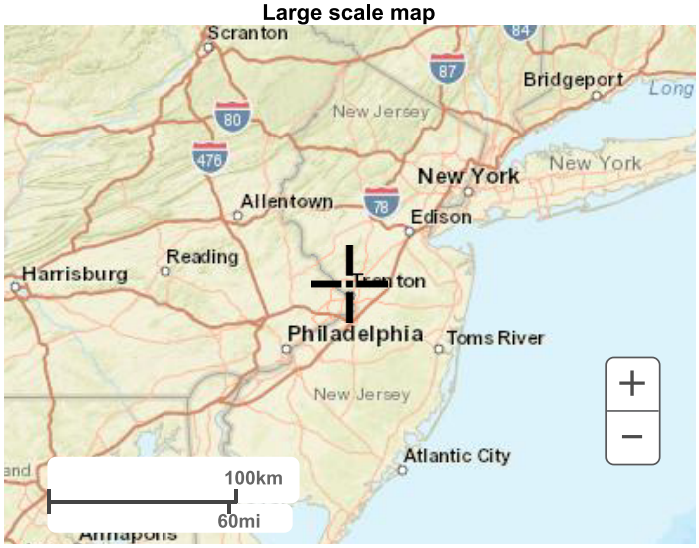
Maps & aerials

Small scale terrain

Large scale terrain

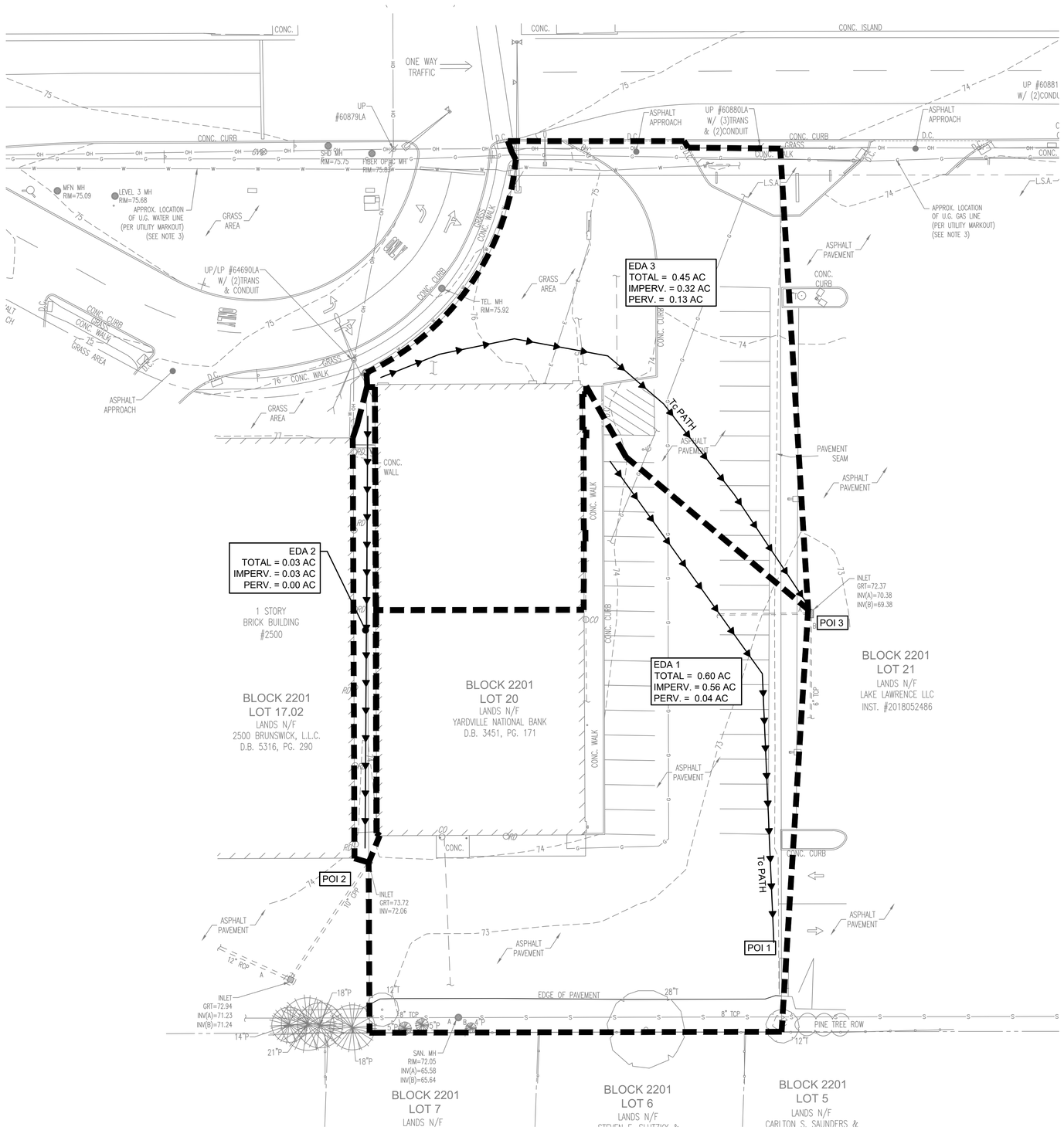


Large scale map



Large scale aerial

Appendix D



0 20' 40'

NOT FOR CONSTRUCTION

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Pennoni

PENNONI ASSOCIATES INC.
515 Grove Street, Suite 1B
Haddon Heights, NJ 08035
T 856.547.0505 F 856.547.9174
NJ COA NO. GA28033300

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

CHAD GAULRAPP
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE NO. GE 41350

04/21/23

TAKE 5 EXPRESS CAR WASH

2530 BRUNSWICK PIKE
LAWRENCE TOWNSHIP, NJ 08648

PRE-DEVELOPED DRAINAGE AREA PLAN

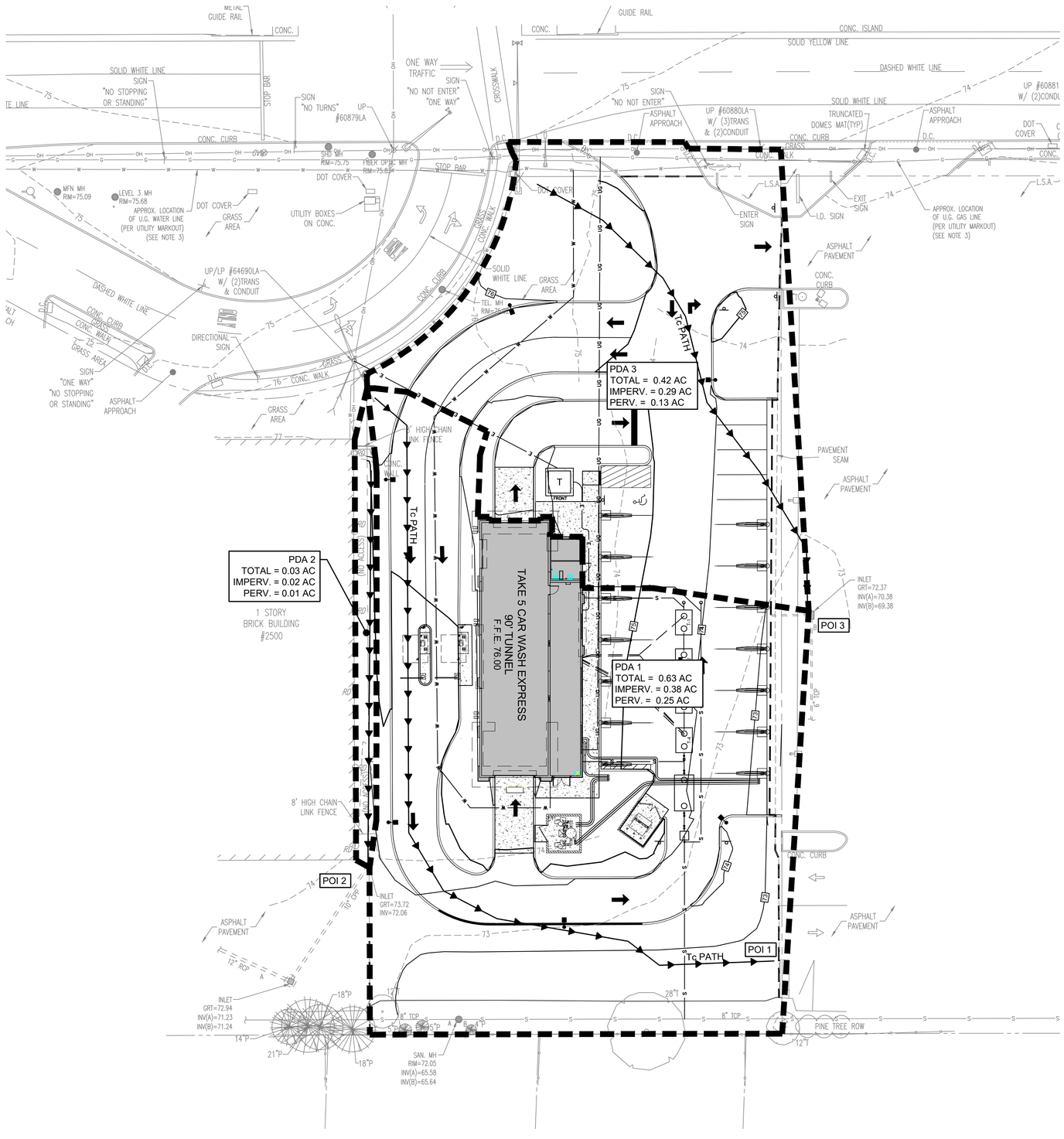
BOING US HOLDCO, INC.
440 SOUTH CHURCH STREET, SUITE 700
CHARLOTTE, NC 28202

NO.	DATE	REVISIONS	BY

PROJECT	DRVBR22047
DATE	2023-04-20
DRAWING SCALE	1"= 20'
DRAWN BY	JRB
APPROVED BY	CG

CS9001

SHEET 1 OF 2



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CHAD GAULRAPP
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE NO. GE 41350

04/21/23

TAKE 5 EXPRESS CAR WASH
2530 BRUNSWICK PIKE
LAWRENCE TOWNSHIP, NJ 08648

POST DEVELOPED DRAINAGE AREA PLAN

BOING US HOLDCO, INC.
440 SOUTH CHURCH STREET, SUITE 700
CHARLOTTE, NC 28202

NO.	DATE	REVISIONS	BY

PROJECT	DRVBR22047
DATE	2023-04-20
DRAWING SCALE	1"= 20'
DRAWN BY	JRB
APPROVED BY	CG

CS9002

SHEET 2 OF 2

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