STORM WATER MANAGEMENT REPORT

SITE LOCATION:
Proposed Residential Site
East St. Paul Avenue
Waukesha, WI

PREPARED FOR:
General Capital Acquisitions, LLC
6938 N. Santa Monica Blvd.
Milwaukee, WI 53217

PREPARED BY:
The Sigma Group, Inc.
1300 West Canal Street
Milwaukee, WI 53233
414-643-4200

Original: July 30th, 2021

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Appendices

Figures

Site Civil Plans (Submitted Concurrently Under Separate Cover)

1. INTRODUCTION

This report presents the storm water management plan, including supporting modeling, analyses and plans/figures, for a proposed industrial development project. The project site is located on East St. Paul Avenue in Waukesha, Wisconsin.

The legal description for the site:
"Part of Lots Six (6), Seven (7), Eight (8), Nine (9), Ten (10) and Eleven (11) in Block Lettered "P" in NORTH WEST ADDITION TO VILLAGE PRAIRIEVILLE, Part of Lots One (1), Two (2) and All of Lots Three (3), Four (4), Five (5), Six (6), Seven (7), Eight (8), Nine (9) and Ten (10) in Block Lettered "B" in BERGELER'S ADDITION to the Village (now City) of Waukesha, and Lands being part of the Southeast and Southwest One-quarter (1/4) of the Northeast One-quarter (1/4) of Section Three (3), in Township Six (6) North, Range Nineteen (19) East, in the City of Waukesha, Waukesha County, Wisconsin."

2. EXISTING CONDITIONS SUMMARY

The existing development site is bounded by East St. Paul Avenue, a commercial development to the North, Barstow Street to the West, a commercial development and residential subdivision to the East and the Fox River to the South. The site is approximately 2.89 acres in area. The site is surfaced with asphalt and concrete pavement, with signs of degraded asphalt and concrete areas throughout. The existing site has approximately 2.49 acres of impervious area. Based on NRCS soils mapping, the site's existing soils include Loamy land (Lu) which is classified as a hydrologic group 'D' (see Appendix A).

3. PROPOSED CONDITIONS SUMMARY

The proposed redevelopment will consist of three multi-story residential buildings with associated site improvements including walks, parking, drives, utilities, and landscaping. To accommodate grades, the regrading of Brehm Street (formally Mary Street) and Bank Street located directly north of the redevelopment will be part of the project. The proposed project will result in an anticipated land disturbance of approximately 5.04 acres. The area that is subject to stormwater management requirements is approximately 3.78 acres.

The development will include the construction of porous pavement with gravel storage to control peak flow rates. The porous pavement system will also be used to for the Total Suspended Solids (TSS) reduction. (See Figures SW 2.0, 3.0 and associated Civil Plans).

4. STORM WATER MANAGEMENT REQUIREMENTS

As a re-development, the project will be subject to the following storm water management requirements: Chapter NR 151 of the Wisconsin Administrative Code (NR 151) and Chapter 32 - Storm Water Management and Erosion Control of the City of Waukesha's Municipal Code. In cases where these regulations overlap, the more stringent requirements have been utilized. Below is a detailed description of the storm water management requirements applicable to this project and relative to the aforementioned regulations.

QUALITY
WDNR NR 151.122 / City of Waukesha Chapter 32
Reduce to the maximum extent practicable, the total suspended solids load by 40% from parking areas and roads, based on an average annual rainfall, as compared to no runoff management controls.

PEAK FLOW REDUCTION
WDNR NR 151.123 /City of Waukesha Chapter 32
Calculated post-development peak storm water discharge rate shall not exceed the calculated pre-development discharge rates for the 1-year, 2-year, 10-year, and 100-year, 24 hour design storms.

INFILTRATION
WDNR NR 151.124 /City of Waukesha Chapter 32
WDNR and City of Waukesha Storm Water Management Plan Requirements exempts redevelopment post-construction sites from infiltration requirements.

5. DESCRIPTION OF PROPOSED STORM WATER MANAGEMENT FACILITIES

Storm water treatment and control requirements for the development will be achieved through the use of a porous pavement system as indicated on Figure SW 2.0 and the associated Civil Plans.

The porous pavement system will have storm water in Watershed Area 2 infiltrating through 4" porous pavement and into a 24" gravel storage layer. 6" drain tile is set at an elevation of 29.34" throughout the gravel storage layer and will direct storm water to a proposed manhole that connects to existing storm sewer.

6. MODELING & CALCULATIONS

The hydraulic calculations and analysis presented in this report were performed using HydroCAD Watershed Modeling software which utilizes the methodologies of TR-55 and TR-20 for a hydrograph-based analysis of watershed conditions. Hydrographs

were developed using the NOAA Atlas 14 rainfall depths with an MSE3 rainfall distribution for the various 24-hr storm events. The 24-hr rainfall depths used in the modeling were as follows: 1-year = 2.40", 2-year = 2.70", 10-year = 3.81" and 100-year = 6.18".

Based on the NRCS soils data for the site, the native soils are type D soils, as used in the modeling.

Time of concentration values were calculated based on standard TR-55 methodology.

Refer to Figure SW 2.0 for data (land cover conditions, curve numbers, times of concentration, etc.) used to model the post development conditions.

WinSLAMM 10.4 was used to model TSS removal for the storm water management measures.

The HydroCAD and WinSLAMM modeling backup are presented in Appendices B, and C.

7. SUMMARY OF MODELING/CALCULATIONS

A summary of results for can be viewed in the tables below:

City of Waukesha Chapter 32 Peak Flow Reduction Summary [match pre-conditions]		
Storm Frequency (yr)	Pre-Conditions Peak Runoff Discharge Rate (cfs)	Post-Development Site Conditions Peak Runoff Discharge Rate (cfs)
1	10.97	**10.04**
2	12.70	**11.52**
10	19.06	**16.96**
100	32.43	**28.50**

Water Quality (TSS Reduction) Summary Table

Pounds of TSS Loading Generated (lbs)	**Pounds of TSS Remaining After Post Control Treatment (lbs)**	**Removal Rate**
279.8	**99.65**	**64.39%**

8. EROSION CONTROL

A construction site WPDES permit is to be in place before land disturbing activities begin. Erosion control inspection during construction will be the responsibility of the General Contractor and erosion control inspection reports are to be kept on-site during construction.

9. MAINTENANCE PLAN

It is understood that the Owner will be responsible for the regular inspection of the storm water management facilities to ensure that they are functioning properly and the Owner will be required to enter into an associated storm water maintenance agreement with the City. The storm water maintenance agreement will reference the required inspection activities.

10. CONCLUSION

Based on Sigma's evaluation, the proposed storm water management approach as summarized in this report and presented on the attached plans and attachments, meets City, MMSD, and WDNR storm water management requirements for peak flow reduction control and TSS removal.

APPENDIX A

SOILS MAP & GEOTECHNICAL REPORT

Map Scale: 1:2,070 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
Survey Area Data: Version 16, Jun 8, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2019—Oct 20, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Lu	Loamy land	D	8.9	99.0%
W	Water		0.1	1.0%
Totals for Area of Interest			**9.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

May 20, 2019

Campbell Capital Group, LLC
587 Glenridge Drive NE
Suite 360
Sandy Springs, GA 30328

Attn: Mr. Michael J. Campbell
Managing Member

Re: Geotechnical Exploration Report
Proposed Residential Apartment/Parking Structure and Restaurant Development
East St. Paul Avenue
Waukesha, Wisconsin
PSI Proposal No.: 00522340

Dear Mr. Campbell:

Professional Service Industries, Inc. (PSI), an Intertek Company, is pleased to submit our Geotechnical Exploration Report for the proposed Residential Apartment/Parking Structure and Restaurant Development located in Waukesha, Wisconsin. This report includes the results of field and laboratory testing; recommendations for foundations, floor slabs, and pavements; as well as general site development recommendations.

PSI appreciates the opportunity to perform this geotechnical study and we look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC

Bradley J. Broback, P.E.
Project Engineer

Ted A. Cera, P.E.
Department Manager
Geotechnical Services

The above Professional Engineering Seal and signature is an electronic reproduction of the original seal and signature. An original copy may be sent if requested. This electronic reproduction shall not be construed as an original or certified document
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GEOTECHNICAL EXPLORATION REPORT

For the:

Proposed Residential Apartment/Parking Structure and
Restaurant Development
East St. Paul Avenue
Waukesha, Wisconsin

Prepared for:

Campbell Capital Group, LLC
587 Glenridge Drive NE
Suite 360
Sandy Springs, GA 30328

Prepared by:

Professional Service Industries, Inc.
821 Corporate Court
Waukesha, WI 53189
(262) 521-2125
Fax (262) 521-2471

PSI Report Number: 00522340

May 20, 2019

Bradley J. Broback, P.E.
Project Engineer

Ted A. Cera, P.E.
Department Manager
Geotechnical Services

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PROJECT INFORMATION

Project Authorization

The following table summarizes, in chronological order, the Project Authorization History for the services performed and represented in this report by Professional Service Industries, Inc. (PSI):

DOCUMENT AND REFERENCE NUMBER	DATE	SOURCE OF REQUEST	AUTHOR OR AGENT
PSI Proposal Number: 266404	2/11/2019	PSI	Mr. Ted A. Cera, P.E.
Notice to Proceed (via signed proposal)	2/13/2019	Campbell Capital Group, LLC.	Mr. Michael J. Campbell
Change Order No. 1	4/23/2019	PSI	Mr. Bradley J. Broback, P.E.
Notice to Proceed (via signed change order)	4/24/2019	Campbell Capital Group, LLC.	Mr. Michael J. Campbell

Project Description

It is understood that the proposed project includes the construction of a residential apartment building, parking structure, and restaurant in Waukesha, Wisconsin. The following table lists the material and information provided for this project:

DESCRIPTION OF MATERIAL	PROVIDER/SOURCE	DATE
Site Survey	RA Smith	12/21/2018
Concept Plan	Poole & Poole Architecture	1/22/2019

The proposed development will reportedly consist of three slab-on-grade buildings without lower levels, including a 4-story apartment building, attached 5-story parking structure with an exposed parking deck, and a 2-story brewery/restaurant. Based on the concept plan provided, the development may also include paved parking and drive areas, as well as a small park area near the Fox River with sidewalk.

The apartment and restaurant building are estimated to be of wood frame construction. Although no structural loading has been provided, the maximum loads for the restaurant and apartment building are estimated to be on the order of about 100 and 300 kips for columns and 4 and 8 kips per linear foot for walls, respectively. The parking structure is estimated to be constructed of precast concrete plank floors. Maximum wall loads on the order of about 20 kips per linear foot and maximum column loads on the order of about 1,000 kips are estimated for the parking structure. Floor slab loads for the buildings are anticipated to be on the order of 150 to 250 pounds per square foot (psf).

Although no planned finished floor elevations have been provided for the buildings, based on the understanding that the existing grades will be raised at least about 2 feet, the

finished floor elevation for all three buildings has been estimated as EL. 34 (local). All elevations referenced in this report are relative to the City of Waukesha local datum.

It is understood that the Sigma Group is performing Phase 1 and 2 Environmental Site Assessments for the property and that contamination may be present at this site.

The following table lists the structural loads and site features that are the design basis for the conclusions contained in this report:

STRUCTURAL LOAD/PROPERTY	REQUIREMENT/DESIGN BASIS	
PROPOSED APARTMENT BUILDING		
Estimated Maximum Column Load	300 kips	B
Estimated Maximum Wall Load	8 kips per linear foot (klf)	B
Estimated Maximum Floor Load	150 to 250 pounds per square foot (psf)	B
Estimated Finished Floor Elevation	EL. 34 (local)	B
PROPOSED PARKING STRUCTURE		
Estimated Maximum Column Load	1,000 kips	B
Estimated Maximum Wall Load	20 kips per linear foot (klf)	B
Estimated Maximum Floor Load	150 to 250 pounds per square foot (psf)	B
Estimated Finished Floor Elevation	EL. 34 (local)	B
PROPOSED BREWERY/RESTAURANT		
Estimated Maximum Column Load	100 kips	B
Estimated Maximum Wall Load	4 kips per linear foot (klf)	B
Estimated Maximum Floor Load	150 to 250 pounds per square foot (psf)	B
Estimated Finished Floor Elevation	EL. 34 (local)	B
PAVEMENT		
Design Period	20 years	B
Pavement 18-kip ESALs (cycle & duration)	Light Duty - 30,000 ESALs	B
Pavement 18-kip ESALs (cycle & duration)	Heavy Duty - 60,000 ESALs	B

B = Report has been prepared based on this estimated parameter in the absence of client supplied information at the time of this report preparation
R = Based on information supplied by others

The geotechnical recommendations presented in this report are based on the available project information, building locations, and the subsurface materials described in this report. If any of the above noted information is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. PSI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site and develop geotechnical design criteria regarding foundations, floor slabs, and pavements

for the planned project. Subgrade preparation recommendations and construction considerations are also provided. As requested, PSI's scope of services included drilling a total of sixteen soil borings (B-1 through B-16), performing eight test pit excavations (TP-1 through TP-8), performing select laboratory testing, and preparing this geotechnical report. Upon completion of the borings, it was elected to perform test pit excavations to further evaluate the fill material rubble content and the size of the rubble, to help estimate the difficulty which may occur with conventional excavation and other foundation types installed by drilling, such as rammed aggregate piers. The test pits were also performed to better estimate the lateral extent of the buried organic soils encountered along the southeast end of the apartment/parking structure building.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on or below, or around this site. Any statements in this report or on the logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The project site is located to the south of the intersection of E. St. Paul Avenue and N. Barstow Street in Waukesha, Wisconsin. The approximate Latitude and Longitude near the center of the proposed development are 43.0132˚N and 88.2314˚W, respectively. The project site was generally vacant at the time of the exploration. The ground surface in the areas of the proposed development consisted of asphalt pavement and grass. An approximate 3 to 4-foot tall retaining wall was present near the northwest boundary of the site near E. St. Paul Avenue. This wall retains a higher grade that exists along the east side of E. St. Paul Avenue.

Based on the survey, the site is gently rolling with existing grades ranging from about EL. 29 to EL. 36. The Fox River is present to the south and Waukesha State Bank is present to the southwest. Historical aerials indicate that there were former buildings in the area of the proposed development as recent as 2011.

Subsurface Conditions

The subsurface conditions were explored within 16 soil test borings (B-1 to B-16) and 8 test pits (TP-1 through TP-8) as requested. The proposed depths of the borings ranged from about 15 to 30 feet. However, auger refusal was encountered at all borings but B-15 and B-16 at depths ranging from about 9.5 to 26.5 feet (EL. 26.5 to EL. 9.5) on possible cobbles, boulders, or bedrock. The following table indicates the general boring locations, approximate ground surface elevations at each boring, and depths to which the borings were completed:

Boring Number	General Location	Approximate Ground Surface Elevation (feet)	Planned Boring Depth (feet)	Approx. Completion Depth/Elevation (feet)
B-1	Apartment Building West	EL. 35	25	17.5/EL. 17.5
B-2	Parking Structure West	EL. 36	30	26.5/EL. 9.5
B-3	Apartment Building Center	EL. 30	25	19.5/EL. 10.5
B-4	Apartment Building South	EL. 29	25	16/EL. 13
B-5	Parking Structure South	EL. 30	30	19/EL. 11
B-6	Parking Structure North	EL. 36	30	9.5/EL. 26.5
B-7	Parking Structure West Center	EL. 31	30	21.5/EL. 9.5
B-8	Parking Structure East Center	EL. 33	30	23/EL. 10
B-9	Parking Structure East	EL. 30	30	17.5/EL. 12.5
B-10	Brewery/Restaurant Northwest	EL. 32	20	16/EL. 16
B-11	Brewery/Restaurant Northeast	EL. 32	20	18.5/EL. 13.5
B-12	Brewery/Restaurant Center	EL. 32	20	18.5/EL. 13.5
B-13	Brewery/Restaurant Southwest	EL. 32	20	19.5/EL. 12.5
B-14	Brewery/Restaurant Southeast	EL. 33	20	18/EL. 15
B-15	Pavement	EL. 30	15	15/EL. 15
B-16	Pavement	EL. 31	15	15/EL. 16

The borings were located in the field by PSI utilizing a consumer-grade handheld GPS device. The approximate boring and test pit locations can be found on the Test Location Plan within the appendix of this report. They are considered accurate to within about 10 feet. The test pit locations were approximated relative to various site features and the borings performed. The elevations of the existing ground surface at the borings and test pits were estimated by interpolation from the site survey provide which included existing grades with one-foot contour intervals. The elevations are considered accurate to within about 1 foot and were rounded to the nearest foot for ease of interpretation within this report.

The borings were advanced utilizing hollow-stem auger drilling methods and soil samples were routinely obtained during the drilling process. Drilling and sampling techniques were accomplished generally in accordance with ASTM procedures. The test pits were performed with a mini excavator. Representative soil samples were obtained from the soil borings and test pits and were returned to PSI's laboratory where they were visually classified using the Unified Soil Classification System (USCS) as a guideline. Further, PSI conducted limited laboratory testing on select soil samples to aid in identifying and describing the physical characteristics of the soils and to aid in defining the site soil stratigraphy. The results of the field exploration and laboratory tests were used in PSI's engineering analysis and in the formulation of our engineering recommendations.

Soil Borings (B-1 through B-16)

The surficial materials at B-3, B-4, B-15, and B-16 consisted of about 3 to 5 inches of asphalt pavement overlying about 7 to 9 inches of sand and gravel aggregate base. The surface materials at the remaining locations consisted of about 4 to 12 inches of topsoil fill generally comprised of dark brown silty sand with root matter.

Below the surface materials at all the borings were fill and possible fill materials extending to depths ranging from about 3 to 8 feet (EL. 28 to EL. 24) generally consisting of brown, dark brown, gray, and black silty sand and gravel, or silty/lean clay with varying amounts of sand, gravel, asphalt rubble, concrete rubble, root matter, and wood. The fill soils at B-5 included an area of black clay with vegetative fibers from about 5.5 to 8 feet (EL. 24.5 to EL. 22). Moisture contents of the granular fill/possible fill materials were in the range of about 3 to 18 percent, indicating a moist to very moist condition. Moisture content of the cohesive fill/possible fill soils were in the range of about 11 to 27 percent, indicating a moist to very moist condition.

Below the above described fill materials at borings B-4, B-9, B-15, and B-16 were organic soils comprised of possible buried topsoil, topsoil fill, and natural silt with vegetative fibers, with low to moderate organic content, extending to depths of about 6.5 to 12 feet (EL. 23.5 to EL. 19) below the ground surface. Several organic content tests by Loss-On-Ignition (LOI) method were performed on these materials. The results of the tests indicated organic contents ranging from about 5.1 to 16.6 percent. Moisture contents of these soils ranged from about 29 to 89 percent. The individual test results are shown on the boring logs in the appendix. A summary of the organic materials encountered in the soil borings are presented in the table below:

Boring Number	Approx. Depth/Bottom El. (feet)	Description	Moisture Content (%)	Organic Content (%)
B-4	8/EL. 21	Possible Buried Topsoil, Dark Gray Lean Clay with Root Matter	45	5.1
B-5	8/EL. 22	Fill, Black Sandy Silty Clay with Vegetative Fibers	29	9.1
B-9	8/EL. 22	Possible Buried Topsoil, Black Silty Clay with Vegetative Fibers	62	10.1
	9.5/EL. 20.5	Dark Brown Silt with Vegetative Fibers	89	not tested
B-15	6.5/EL. 23.5	Possible Buried Topsoil, Black Silty Clay with Root Matter	37	16.6
B-16	5.5/EL. 25.5	Possible Buried Topsoil, Black and Brown Lean Clay, Trace Root Matter	34	not tested
	8/EL. 23	Dark Gray Lean Clay with Root Matter	84	not tested
	12/EL. 19	Dark Brown Silt with Vegetative Fibers	51	not tested

Below the above described fill, possible fill, and organic soils, native brown and gray silty sand and gravel with clay seams were encountered extending to the termination depths of the borings. The exceptions to the foregoing occurred at B-10 through B-12, where

natural lean clay and silty clay were encountered above the silty sand and gravel to depths ranging from about 8 to 12 feet (EL. 24 to EL. 20). Moisture contents of the natural silty sand and gravel ranged from about 3 to 14 percent, indicating a moist to wet condition. Strength tests indicated medium dense to very dense relative density with N-values ranging from about 11 blows per foot to 50 blows for 1 inch of split spoon sampler penetration (generally greater than about 20 bpf). Moisture contents of the native clay soils were in the range of about 16 to 27 percent, indicating a moist to very moist condition. The native brown lean clay soils were generally stiff to hard in consistency with estimated unconfined compressive strengths in the range of about 1.75 to 4.3 tsf. As an exception, the natural lean clay at B-11 below the existing fill, to a depth of about 12 feet displayed soft consistency with estimated unconfined compressive strengths on the order of about 0.25 tsf.

It should be noted that at B-7 and B-8, black and dark gray silty sand and gravel with possible petroleum-type odors were encountered at depths of about 12 to 17 (EL. 19 to EL. 14 and EL. 21 to EL. 16, respectively).

Auger refusal was encountered at all the borings except B-15 and B-16, on possible cobbles, boulders, or bedrock. Refusal depths ranged from about 9.5 to 26.5 feet (EL. 26.5 to EL. 9.5) below existing grades.

Test Pit Excavations (TP-1 through TP-8)

Upon completion of the borings, it was elected to perform test pit excavations with a mini excavator to further evaluate the fill material rubble content and the size of the rubble, to help estimate the difficulty which may occur with conventional excavation and other foundation types installed by drilling, such as rammed aggregate piers. The test pits were also performed to better estimate the lateral extent of the buried organic soils encountered along the southeast end of the apartment/parking structure building.

Below the surface topsoil fill at all the test pits, was existing fill to depths of about 6 to 9 feet (EL. 29 to EL. 21) below existing grades. The existing fill generally consisted of brown, gray, and black silty sand with lean clay pockets, concrete pieces (about 18 to 24 inches wide), bricks, cobbles, boulders, possible coal cinders, and possible foundry slag. At TP-2, TP-3, and TP-5, the excavations ended within the existing fill materials, due to difficult excavation on cobbles and boulders. Below the existing silty sand and gravel fill at TP-1, TP-7, and TP-8, were possible buried topsoil (black lean clay or silty clay with vegetative fibers and root matter), lean clay fill with root matter, or brown organic fibrous silt to depths of about 9 to 10 feet (EL. 21 to EL. 20). Several organic content tests by Loss-On-Ignition (LOI) method were performed on these materials. The results of the tests indicated organic contents ranging from about 10.3 to 32.7 percent. Moisture contents of these soils ranged from about 45 to 134 percent. The individual test results are shown on the test pit logs in the appendix. A summary of the organic materials encountered in the test pits are presented in the table below:

BORING NUMBER	DEPTH/BOTTOM EL. (FEET)	DESCRIPTION	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
TP-1	7/EL. 23	Possible Buried Topsoil, Black Silty Clay with Vegetative Fibers	92	17.6
	9/EL. 21	Brown Vegetative Fibrous Silt	103	23.9
TP-7	7.5/EL. 22.5	Fill, Black Lean Clay with Root Matter	45	12.7
TP-8	7/EL. 23	Possible Buried Topsoil, Black Lean Clay with Root Matter	48	10.3
	8.5/EL. 21.5	Brown Vegetative Fibrous Silt	134	32.7

Below the existing fill and buried organic soils at TP-1, TP-4, TP-6, TP-7, and TP-8, were natural gray or light brown silty sand and gravel or lean clay to the termination depths of the test pits.

The above subsurface descriptions are of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring and test pit logs included in the appendix should be reviewed for specific information at individual test locations. These records include soil descriptions, stratifications, penetration resistances, locations of the samples and laboratory test data. The stratifications shown on the logs represent the conditions at the actual test locations only. Variations may occur and should be expected between test locations. The stratification represents the approximate boundaries between subsurface materials and the actual transitions may be gradual. Water level information obtained during field operations is also shown on these boring logs. The samples that were not discarded during classification or altered by laboratory testing will be retained for 60 days from the date of this report and then will be discarded.

Groundwater Information

Groundwater observations were made during the drilling operations, and in the open boreholes and test pits at completion. Water was encountered during auger advancement at most of the borings performed at depths ranging from about 8 to 13.5 feet (EL. 24.5 to EL. 18). Upon completion and removal of the augers, water was present at borings B-4, B-5, and B-7 through B-16 above the caved soils, at depths ranging from about 8 to 10 feet (EL. 23 to EL. 19). No water was encountered in any of the test pit excavations. The following table summarizes the water levels observed during and upon completion of drilling.

BORING NUMBER	APPROXIMATE GROUND SURFACE ELEVATION (FEET)	APPROX. DEPTH OF WATER/EL. DURING DRILLING (FEET)	APPROX. DEPTH OF WATER/EL. UPON COMPLETION OF DRILLING (FEET)
B-1	EL. 35	13.5/EL. 21.5	Not Observed*
B-2	EL. 36	12/EL. 24	Not Observed*
B-3	EL. 30	8.5/EL. 21.5	Not Observed*
B-4	EL. 29	8.5/EL. 20.5	10/EL. 19
B-5	EL. 30	12/EL. 18	9/EL. 21
B-6	EL. 36	Not Observed	Not Observed*
B-7	EL. 31	8/EL. 23	8/EL. 23
B-8	EL. 33	12/EL. 21	10/EL. 23
B-9	EL. 30	12/EL. 18	10/EL. 20
B-10	EL. 32	12/EL. 20	10/EL. 22
B-11	EL. 32	8.5/EL. 23.5	9/EL. 23
B-12	EL. 32	8.5/EL. 23.5	9.5/EL. 22.5
B-13	EL. 32	8/EL. 24	10/EL. 22
B-14	EL. 33	8.5/EL. 24.5	10/EL. 23
B-15	EL. 30	12/EL. 18	9/EL. 21
B-16	EL. 31	12/EL. 19	9/EL. 22

*Not observed above caved soils upon removal of augers

The groundwater level at the site, as well as perched water levels and volumes, will fluctuate based on variations in rainfall, snowmelt, evaporation, surface run-off and other related hydrogeologic factors. The water level at the site may also vary with the level of the adjacent Fox River. The water level measurements presented in this report are the levels that were measured at the time of PSI's field activities. The possibility of groundwater level fluctuation and perched water conditions should be considered when developing the design and construction plans for the project. Longer term monitoring would be required to better evaluate groundwater levels on this site.

EVALUATION AND RECOMMENDATIONS

Geotechnical Discussion

There are ***four*** primary geotechnical related concerns at this site. The following summarizes these concerns:

1) ***Existing undocumented fill and possible fill were encountered within all the borings and test pits, extending to depths of about 3 to 9 feet (EL. 29 to EL. 21) below the ground surface. In addition, possible buried topsoil, fill with***

root matter, and natural organic fibrous silt were encountered within building borings B-4, B-5, and B-9, and test pits TP-1, TP-7, and TP-8, extending to depths of about 8 to 10 feet (EL. 22 to EL. 20) below the ground surface. It should be anticipated that the depth and composition of these soils will vary between test locations.

In addition, low strength natural lean clay soils were present at B-11 down to about 12 feet (EL. 20). The organic content of the buried organic soils ranged from about 5.1 to 32.7, indicating moderate to high organic content. The existing fill, underlying organic soils, and low strength natural soils are not considered suitable for support of foundations due to their potential for overall and differential settlement and resultant distress to the overlying foundations. As such, these materials must be removed where present below foundations. Based on an estimated finished floor elevation of EL. 34 for all the buildings, over-excavations of about 2 to 12 feet below frost depth are estimated. Where conventional over-excavation of the organic soils and replacement with structural fill is not considered feasible due to the over-excavation depths, possible soil contamination, and possible difficulties with encountering groundwater in the over-excavations, alternative foundation systems such as grade beams supported by drilled piers, or rammed aggregate piers, such as a Geopier® system, can be considered. Where these alternative systems are being considered, PSI can offer additional recommendations when requested.

It is anticipated that for the most part, the existing fill and possible fill materials, which are not underlain by the buried organic soils, will be suitable for subgrade support within the slab-on-grade areas for the proposed buildings, provided they are properly prepared as outlined in the report. However, it appears that the buried organic materials are present within the approximate southeastern half of the proposed apartment/parking structure building. The existing buried organic soils are not considered suitable for support of the proposed floor slabs. The organic materials must be removed in their entirety from the building footprints and replaced with suitable materials which are placed and compacted as indicated in the Site Preparation section; or the floor slabs in this area must be designed as structural slabs supported by the foundations. As an alternative, the floor slab subgrade may be able to be reinforced with rammed aggregate piers, with the floor slab being supported by the improved subgrade.

Design of a conventional flexible (asphalt) pavement on the existing subgrade soils will generally require a somewhat thicker pavement section and an increased maintenance program throughout the pavement design life.

2) It should be anticipated that the near surface clayey and silty soils at this site may be in a very moist to wet condition once exposed below the surface materials, which may result in these materials being unstable.

The subgrade soils encountered at the borings and test pits below the surface topsoil consisted of silty sand or clay soils which were generally moist to very moist during the exploration. Additionally, rainfall, thaw, or snow melt prior to construction may further

increase the moisture contents of these soils. These soils are very sensitive to moisture and disturbance. Higher moisture contents, if encountered during site preparation, will cause the clayey and silty soils to be unstable, especially when subjected to construction traffic. Based on the near surface soils at many of the boring locations being very moist during the exploration, significant difficulty is anticipated with respect to subgrade preparation and may become widespread depending upon site conditions at the time of construction. Where observed during construction, very moist or wet, unstable soils may either be scarified, dried and recompacted to a minimum of 95 percent of the maximum dry density as obtained by the standard Proctor test (ASTM D698), or excavated below subgrade (EBS), and replaced with a select granular material such as the dense graded material specified in Sections 209 or 305 of the WisDOT Standard Specifications. A representative of the geotechnical engineer should be present at the time of construction to help determine the areas requiring remediation and the over-excavation depths necessary.

3) Auger refusal on possible cobbles, boulders, or bedrock was observed within most of the borings.

Auger refusal was encountered within all the borings except B-15 and B-16 at depths of about 9.5 to 26.5 feet (EL. 26.5 to EL. 9.5) below existing grades. In addition, generally very dense conditions were encountered with increasing depth. Although it is anticipated that foundation excavations and shallow utility excavations will remain above these refusal depths, specialized excavation techniques, and/or blasting may be necessary where planned utility invert elevations are below refusal depths. It is recommended that additional exploration with backhoe excavated test pits be performed in any areas where it is anticipated that the boring refusal depths may be present above planned development grades, in order to better evaluate the depth, type, and excavatability of the refusal materials. Also, difficult digging is anticipated with increasing depth due to the general dense nature of the natural soils and the possible presence of cobbles and boulders. Longer excavation times should be expected.

Additionally, asphalt and concrete rubble, cobbles, and boulders were encountered within the existing fill. Based on the test pits performed, concrete rubble approximately 18 to 24 inches wide, as well as cobbles and boulders, were present within some of the fill materials. At least some difficulty is anticipated with conventional excavation as well as any drilling necessary for foundations within the existing fill, especially where the concrete rubble fill is in a dense to very dense condition.

4) Groundwater levels observed within the borings generally ranged between about EL. 24.5 to EL. 18.

Based upon an estimated finished floor elevation of EL. 34 feet, the groundwater level observed is not considered to be an issue with the slab-on-grade construction proposed. However, where over-excavation is performed in the area of foundation or floor slab subgrade, these excavations will likely encroach upon or extend below the groundwater level. Where over-excavations encroach upon or extend only several inches below the

groundwater, conventional dewatering with filtered pumps and sumps may be sufficient to control the water. However, where excavations extend more than several inches below the groundwater, dewatering with a series of sumps or well-points along with high capacity pumps may be necessary to maintain the water level at least two feet beneath the over-excavation depth to maintain stability. The contractor must determine the site water levels and the means and methods that will be required for appropriate dewatering prior to bidding and construction.

The following geotechnical related recommendations have been developed on the basis of the subsurface conditions encountered and PSI's understanding of the proposed development. Should changes in the project criteria occur, a review must be made by PSI to determine if modifications to our recommendations will be required.

Environmental Issues

Possible petroleum type odors were encountered at B-7 and B-8 from depths of about 12 to 17 feet (EL. 21 feet to EL. 14 feet). In addition, possible coal cinders and foundry sand or slag were observed at borings B-9, B-13, and B-15, and at test pits TP-1, TP-6 and TP-8. These materials are generally considered to pose some possible environmental concerns for the project. It is understood that the project environmental consultant was in the process of performing Phase 1 and 2 Environmental Site Assessments at the time of this report preparation. The project environmental consultant should be provided with a copy of this report. At that time, additional borings or test pits may be recommended by the environmental consultant to further evaluate the possible presence of petroleum affected soils, coal cinders, and foundry materials.

In general, however, if petroleum affected soils are encountered during construction, a more detailed evaluation and possible remediation may be required. In addition, special disposal of petroleum affected soils at an approved landfill may be necessary, resulting in substantially increased costs (excavation, trucking, and backfill) and construction delays.

The Wisconsin Department of Natural Resources (WDNR) considers foundry sands and other industrial derived wastes to be solid waste and as such their use and disposal are regulated. Construction of the proposed buildings may result in generating an excess of these fill and waste materials, which may need to be disposed of offsite. In accordance with current regulations, prior to disposing of these materials, they must be first characterized to verify they are acceptable for disposal at an approved solid waste disposal facility. It may also be possible to manage and/or beneficially reuse the existing foundry materials on-site. This alternative, however, would require the development of a site-specific materials handling plan.

Site Preparation

Prior to the placement of new fill or preparation of the construction area subgrade, PSI recommends that any surficial topsoil materials, vegetation, or other unsuitable soils be removed from within and to a minimum distance of 10 feet or equal to the depth of fill to

be placed below the floor slab, whichever is greater, beyond the proposed building footprints, pavements, and other structural areas. The topsoil depth at the borings ranged from about 4 to 12 inches in thickness. The existing pavement in new building or pavement areas must be also be removed in its entirety. Where properly pulverized or milled, the asphalt materials can be used as new structural fill or aggregate base where permissible. The existing pavement at the borings consisted of about 3 to 5 inches of asphalt overlying about 7 to 9 inches of aggregate base. Existing below grade utilities may need to be rerouted around the proposed construction.

The subsurface materials may also include former foundations, foundation walls, floor slabs, or other structural elements which all must be removed from within new building areas where encountered. Complete removal of foundations, foundation walls, or concrete floor slabs need not be performed within pavement areas; however, PSI recommends they be removed to a minimum depth of 2 feet below subgrade to provide a uniform subgrade condition. It should be noted however, that where foundations and foundation walls are left in-place, they may create obstructions during utility installation.

Subsequent to cutting high areas of the site to planned grades, and prior to placement of new fills in low areas, the subgrades within the building and pavement areas should be thoroughly proof compacted with surface compaction with overlapping passes and at right angles with a heavy (minimum 10-ton static weight) compactor. After proof compaction, the exposed subgrade must be proof rolled to identify soft or loose zones which must be properly remediated. A fully loaded tandem axle dump truck, or rubber-tired vehicle of similar size and weight, typically 9 tons/axle, should be used for the proof roll. Based on the borings, unstable areas will likely be encountered in many areas of the site, and could be widespread across the project area, especially where the existing clayey or silty soils are in a very moist or wet condition. The subgrade soils below the surface materials at B-4, B-6 through B-11, and B-15 were in a very moist condition at the time of the exploration. These areas and other areas of the site may be in a very moist condition at the time of construction. Soils that are observed to rut or deflect excessively under the moving load (typically greater than about 1 inch) should be scarified, aerated, and recompacted, if feasible; or undercut and replaced with properly compacted engineered fill such as those materials identified in WisDOT Standard Specifications Sections 305. In areas of over-excavation, excavation below subgrade to a depth of about 1 to 2 feet and the placement of select granular fill, along with the placement of a geotextile, if necessary, can generally be used to improve the stability of the subgrade. However, greater over-excavation depths may be necessary in isolated areas, depending on stability observed. The use of a coarse crushed material (such as 3-inch Breaker Run) can also be utilized as necessary to aid in stabilizing subgrades. Subgrade preparation during dry periods will help facilitate this process. Due care must be used during proof rolling to avoid damage to any existing structures or underground utilities. Soils that are observed to rut or deflect excessively under the moving load (typically greater than about 1 inch) must be removed or improved by appropriate preparation and compaction techniques. The proof compacting, proof rolling, and any undercutting activities should be monitored and documented by a representative of a qualified geotechnical engineer and should be performed during a period of dry weather.

After subgrade preparation and observation have been completed, placement of new fills required to obtain proposed grades may begin. Where structural fill placement is required for this project, newly placed engineered fill should be free of organic, frozen, or other deleterious materials, have a maximum particle less than 3 inches. Clay fills should have a liquid limit less than 45 and plasticity index less than 25. If a fine-grained clay soil is used for fill, close moisture content control will be required to achieve the recommended degree of compaction. Engineered fill should be placed in maximum lifts of eight inches of loose material and compacted to at least 95 percent of the maximum dry density and within 3 percent of the optimum moisture content as determined by the standard Proctor ASTM Designation D698. Also, PSI recommends that a qualified geotechnical engineer test and document the engineered fill materials during placement.

If water is to be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Each lift of compacted engineered fill should be observed and tested by a representative of PSI prior to placement of subsequent lifts. The lateral extent of the over-excavation of unstable soil and subsequent placement and compaction of engineered fill should be equal to or greater than the depth of over-excavation below finished floor elevation. As for the pavement areas, the newly placed compacted engineered fill should extend at least 5 feet beyond the edges of the pavement for fills less than or equal to 5 feet.

Every effort must be made to keep excavations dry. If construction proceeds during wet weather, some additional over-excavation may be necessary. If weather permits, the soil could be dried and recompacted. A crushed stone working mat, possibly in conjunction with a geotextile fabric may also be feasible to help stabilize subgrades. Site grading runoff should be directed to catch basins, so that the potential for the softening of the foundation and pavement subgrade soils is reduced.

The adherence to the initial site preparation recommendations are considered critical to verify a suitable subgrade exists, prior to the placement of any new fills required to obtain project grades. Some surficial instability should be anticipated across the site due to the moisture sensitive nature of the clay soils and the presence of fill in areas. During earthwork operations, a representative of the geotechnical engineer should be present on-site on a full-time basis to verify the subgrade conditions and placement and compaction of new fills.

Foundation Recommendations

Based on the borings and test pits performed, existing fill and possible fill were present at all the building borings and test pits to depths ranging from about 3 to 12 feet (EL. 28 to EL. 18) below existing grades. Additionally, possible buried topsoil, topsoil fill, and natural organic fibrous silt was present at B-4, B-9, TP-1, TP-7, and TP-8 below the existing fill to depths of about 8 to 10 feet (EL. 21 to EL. 20). The organic content of the buried organic soils ranged from about 5.1 to 32.7, indicating moderate to high organic content. At B-11, natural very soft and wet lean clay was also present. Fill, buried organics, and low

strength natural soils are not considered suitable for support of foundations based on their potential for settlement and resultant distress to the overlying foundation elements. As such, foundations must be extended through these materials to bear upon suitable underlying natural soils. However, it must be recognized that due to the depth of over-excavation required in many areas, and the potential for encountering groundwater and contaminated soils in the over-excavations, significant difficulty with excavation and subgrade stability, and difficulties with groundwater will likely be encountered with an over-excavation option.

The finished floor elevations of the proposed buildings were not provided to PSI at the time of this report. However, it is understood that at least about 2 feet of fill will be required across the site. As such, it has been estimated that the finished floor elevation of all the buildings will be at EL. 34. The following table indicates the depth of fill/possible fill, soft natural soils, and buried organic soils (where present) at each building boring and test pit location, and the estimated depth of these materials below the approximate frost foundation depth.

BORING	ESTIMATED PERIMETER FOUNDATION BEARING GRADE (FEET)	ESTIMATED DEPTH/ELEVATION OF EXISTING FILL/POSSIBLE FILL AND BURIED ORGANICS (FEET)	ESTIMATED DEPTH OF EXISTING FILL/POSSIBLE FILL AND BURIED ORGANICS BELOW FROST DEPTH (FEET)
B-1	EL. 30	8/EL. 27	3
B-2	EL. 30	8/EL. 28	2
B-3	EL. 30	3/EL. 27	3
B-4	EL. 30	8/EL.21	9
B-5	EL. 30	12/EL. 18	12
B-6	EL. 30	8/EL. 28	2
B-7	EL. 30	3/EL. 28	2
B-8	EL. 30	5.5/EL. 27.5	2.5
B-9	EL. 30	9.5/EL. 20.5	9.5
B-10	EL. 30	5.5/EL. 26.5	3.5
B-11	EL. 30	12/EL. 20*	10
B-12	EL. 30	5.5/EL. 26.5	3.5
B-13	EL. 30	8/EL. 24	6
B-14	EL. 30	8/EL. 25	5
TP-1	EL. 30	10/EL. 20	10
TP-2	EL. 30	>9/<EL. 21	>9
TP-3	EL. 30	>7/<EL.<29	>1
TP-4	EL. 30	6.5/EL. 25.5	4.5
TP-5	EL. 30	>6/<EL. 26	>4
TP-6	EL. 30	6.5/EL. 24.5	5.5
TP-7	EL. 30	9/EL. 21	9
TP-8	EL. 30	9.5/EL. 20.5	9.5

*Includes layer of soft natural wet lean clay

The above depths are estimates and should not be considered to yield exact and final quantities. Interpolation between test locations can be performed for rough estimating purposes. However, variations in depths can occur over short distances between and beyond the borings and test pits performed. The depth of fill and buried organics within the proposed apartment/parking structure buildings generally increases from northwest to southeast (generally toward the river). The elevation of suitable natural soils in the apartment/parking structure building varies from about EL. 28 to EL. 18. Within the proposed restaurant, the elevation of natural soils generally ranged from about EL. 26.5 to EL. 24. However, very soft natural clay soils were present at B-11 down to EL. 20.

Based on the foregoing, foundations bearing upon suitable natural medium dense to very dense granular soils that have been observed, tested, and prepared as recommended in the Site Preparation section of this report, or upon lean concrete placed upon these natural granular soils, can be designed for a maximum net allowable soil bearing pressure of **5,000 pounds per square foot (psf)** based on dead load plus design live load. Some over-excavation of the natural lean clay soils will be necessary in the areas of B-10 and B-12 in order to utilize the 5,000 psf allowable bearing capacity. Where foundations are bearing upon the natural lean clay soils or upon compacted backfill materials placed upon suitable natural soils, they may be designed for a net allowable bearing pressure of **3,000 psf**.

Where the existing fill, buried organic soils, or other unsuitable soils are encountered below foundation subgrade, the excavation should be deepened to competent bearing natural soil, and the footing could be lowered, or an over-excavation and backfill procedure could be performed. Over-excavation and backfilling require a lateral extension of the excavation beyond the outside edge of the foundation element for a distance at least equal to the over-excavation depth below planned bearing grade. Suitable backfill materials such as those specified in WisDOT Standard Specifications sections 209 or 305, can then be placed in lifts and compacted to a minimum of 95 percent of the maximum dry density as determined by the Standard Proctor Test (ASTM D698). However, use of this option will result in a recommended net allowable bearing pressure of 3,000 psf.

In lieu of the use of deep spread footings, or backfilling with compacted structural fill, any unsuitable materials could be removed from beneath footings and the excavation backfilled to the original planned bearing depth with a lean concrete slurry mix. If it is elected to utilize a lean concrete slurry to replace the unsuitable soils, the foundation excavations should be 4 inches wider than the proposed footing width and must extend through the unsuitable materials to expose suitable underlying natural soils. The slurry must be placed immediately after excavation to avoid intrusion of soil into the excavation. The concrete should contain sufficient aggregate and cement to attain a 28-day compressive strength of at least 1,000 psi. Some sloughing or caving of the overlying soils may be experienced (especially for deeper excavations). Should this occur during the slurry placement, the area must be removed and recast. Additionally, should caving become extensive, it may be necessary to substantially widen excavations to avoid soil intrusion into the concrete slurry. This may result in the use of

additional slurry quantities significantly in excess of preconstruction budget estimates. Again, foundations placed upon lean concrete which is placed upon the natural medium dense to very dense natural granular soils may be designed for a net allowable bearing pressure of 5,000 psf.

Where conventional over-excavation of the existing fill soils and buried organic soils, and replacement with structural fill is not considered feasible due to the significant depths and potential difficulties with groundwater and possible contaminated soils, alternative foundation systems such as grade beams supported by drilled piers or a rammed aggregate pier supported foundation such as a Geopier® system can be considered. Where these alternative systems are being considered, PSI can offer additional recommendations when requested.

The footings must be supported by suitable bearing soils prepared in accordance with the Site Preparation section and that have been observed and tested in the field by a representative of a qualified geotechnical engineer. A method for evaluating the acceptability of the natural soils would involve hand auger and static cone penetrometer testing below the footing bearing level. Each isolated footing should include at least 1 test probe. Test probes should be performed every 20 linear feet in continuous footings.

Minimum dimensions of 24 inches for continuous footings and 30 inches for any column footings should be used in foundation design to minimize the possibility of a local bearing capacity failure, even if the allowable bearing pressure recommended herein is not fully utilized.

Exterior footings and footings in unheated areas should be located at a depth of at least 48 inches below the final exterior grade to provide adequate frost protection. If the building is to be constructed during the winter months or if footings will likely be subjected to freezing temperatures after foundation construction, then the footings and concrete should be adequately protected from freezing.

After opening, PSI recommends that the soils at foundation bearing elevation in the footing excavations be observed and tested by a representative of a qualified geotechnical engineer prior to concrete placement, to evaluate the suitability and uniformity of the bearing materials for support of the design foundation loads. Once the support soils are observed and tested, the concrete should be placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. The foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

In general, the performance of the foundation system on this site is dependent on the various factors discussed herein. The excavation, preparation, and concreting of foundations must be monitored and tested by a representative of a qualified geotechnical engineer.

Floor Slab Recommendations

In general, the floor slabs of the proposed buildings can be supported upon the existing fill soils and/or newly placed compacted engineered fill, where the existing fill is not underlain by buried topsoil, topsoil fill, or natural organic soils (or does not include areas of organic fill), and provided the subgrade is prepared as outlined in the Site Preparation section.

However, it must be recognized that the fill soils encountered within the approximate southeastern half of the apartment/parking structure building at B-4, B-5, B-12, TP-1, TP-7, and TP-8 were underlain by buried topsoil, topsoil fill, or natural organic fibrous silt to depths ranging from about 8 to 10 feet (EL. 21 to EL. 20). Organic soils have the potential to exhibit significant compressibility due to existing and future loading and can also display settlement due to decomposition of the organic materials over time. As such, these soils are not recommended for support of the floor slab. As one option, these soils could be removed in their entirety and replaced with properly placed and compacted structural fill. However, removal of these materials is not likely to be economically feasible due to the depths of removal that would be necessary. Other alternatives would be to design the floor slabs underlain by organic soils (southeastern half of the apartment/parking structure buildings) as structural slabs supported by the foundation system. Additionally, the floor slab areas where the buried organics are present can be reinforced with Geopiers®, where Geopiers® are being considered for support of the foundations. Additional recommendations regarding Geopiers® can be provided when requested.

Based on the existing fill soils consisting of silty sand and lean clay, PSI recommends that a subgrade modulus (k) of 125 pounds per cubic inch (pci) be used for design considerations based on a 12-inch square plate load test. However, depending on how the slab loads are applied, the value will have to be geometrically standard. The value should be adjusted for larger areas using the following expression for cohesive and cohesionless soil:

Modulus of Subgrade Reaction, $k_s = (\frac{k}{B})$ for cohesive soil and

$k_s = k\,(\frac{B+1}{2B})^2$ for cohesionless soil

where: k_s = coefficient of vertical subgrade reaction for loaded area,
k = coefficient of vertical subgrade reaction for 144 square inch area
B = width of area loaded, in feet

Where the existing buried organics and fill are removed and replaced with new structural fill, a different modulus may be necessary in this area depending upon the materials used as backfill. Also, where the slab is reinforced with rammed aggregate piers, a modified modulus may also be necessary in this area. PSI recommends that a minimum four-inch thick free draining granular mat be placed beneath the floor slabs to enhance drainage. Polyethylene sheeting should be placed to act as a vapor retarder where the floor will be

in contact with moisture sensitive equipment or products such as tile, wood, carpet, etc., as directed by the design engineer. The decision to locate the vapor retarder in direct contact with the slab or beneath the layer of granular fill should be made by the design engineer after considering the moisture sensitivity of subsequent floor finishes, anticipated project conditions and the potential effects of slab curling and cracking. The proper use of a vapor retarder may not completely prevent moisture beneath or on top of slabs. The floor slabs should have an adequate number of joints to reduce cracking resulting from differential movement and shrinkage.

The floor slabs must be suitably reinforced to make them as rigid as necessary, and proper joints must be provided at the junction of slab and the foundation system so that a small amount of independent movement can occur without causing damage. Large floor areas must be provided with joints at frequent intervals (maximum spacing of 30 times the slab thickness, per ACI) to compensate for concrete volume changes (shrinkage). Where the slabs will be supporting live loads, such as from moving vehicles, joints must be keyed or dowelled to permit proper load transfer. It is recommended that appropriate construction methods and curing procedures be used to minimize shrinkage and curling of the floor slabs.

Prior to constructing the floor slabs, the exposed subgrade must be prepared utilizing the subgrade preparation (including the proof compaction and proof rolling procedures) described previously in the Site Preparation section of this report. It must be recognized that the high clay content soils are highly sensitive to increases in moisture and construction disturbance. It will therefore be necessary to maintain these materials in a relatively dry condition to allow for proper subgrade preparation. It is recommended that proof rolling operations be monitored by a representative of the geotechnical engineer to ensure that a firm, suitable subgrade is present prior to placement of new fills, or to construction of floor slabs and pavements.

Exterior/Unheated Area Slabs

Entry slabs, sidewalks, aprons, and other slabs in exterior or unheated areas will likely bear upon clayey and silty soils. Such materials are frost susceptible and poorly drained. Slabs placed directly upon such soils are subject to heaving and subsequent settlement due to freeze/thaw cycles. This can result in cracking, misalignment, and other related effects (especially at joints). Where encountered in exterior/unheated area slabs, it is recommended that consideration be given to limited undercutting of the frost susceptible materials to a depth of 1 to 2 feet below the slabs, and replacement with well graded, properly placed and compacted granular soils with limited fines. A properly designed underdrain system connected to the municipal sewer (if permissible) or directed to on-site storm water management devices should also be incorporated to reduce the potential effects of freeze/thaw cycles.

Seismic Site Class

The 2015 International Building Code requires a site class for the calculation of earthquake design forces. This class is a function of soils type (i.e. depth of soil and strata types). Based on the estimated density of the natural nonorganic soils observed within the boring locations, **Site Class "C"** is recommended.

Pavement Recommendations

It is understood that paved drive lanes and parking lots may be included in the development. PSI anticipates the subgrade soils within the pavement areas to consist of existing fill comprised silty sand or lean clay, or newly placed and compacted engineered fill. PSI recommends that the subgrade soils for the pavements be prepared in accordance with the Site Preparation section of this report, including proof compacting and proof rolling.

Recognizing that complete removal and replacement of the existing fill and any underlying buried organic soil will not likely be economically feasible within pavement areas on this site, these materials can be left in place for support, provided they are properly prepared as outlined in this report and some inherent risk of construction upon these soils is accepted. This risk includes acceptance of reduced pavement performance, the need for some increased pavement maintenance, and a possible reduced pavement service life.

The existing soils have been assigned an estimated visual/manual classification of A-6 by the AASHTO soil classification system. These soils are generally rated as poor for pavement subgrade support based on their high shrink-swell potential, high frost susceptibility, poor drainage, and their potential to soften when exposed to moisture. They have a frost index of F-3, a Wisconsin design group index of about 14, and a soil support value (SSV) of about 4.0. In order to use these values, all new fill used to raise low areas must have pavement support characteristics that are equal to or better than these existing soils

The following subgrade parameters are recommended for pavement design considerations based upon the presence of at least some areas of lean clay soils and their anticipated subgrade support conditions:

AASHTO Soil Classification	Material	SSV	DGI	Subgrade Reaction Modulus, k (pci)	Resilient Modulus, M_R (psi)	CBR	Frost Index
A-6	II-Poorly Sorted	4.0	14	125	2,800	3	F-3

During construction, the surficial subgrade soils can become wet, softened, and disturbed from rainfall and construction equipment. Therefore, prior to placing the pavement base materials, the subgrade must be recompacted and proof rolled. Particular attention should be given to high traffic areas that have become rutted and areas of backfilled trenches. Localized wet, soft, or unstable areas can be undercut to such depths determined

necessary in the field to reach stable materials, and the area backfilled with crushed stone (possibly in conjunction with a geotextile fabric where necessary), such as 1.25 inch traffic bond (Section 305 of the State of Wisconsin Standard Specifications). Preparation of the pavement subgrade must be performed as outlined in the Site Preparation section of this report.

The granular base course should consist of well-graded crushed stone meeting the requirements from Section 305 of the State of Wisconsin Standard Specifications for Construction for a 1.25-inch dense graded base. The granular base course material should be placed and compacted to a minimum of 95 percent of the maximum density as determined by ASTM D698 (standard Proctor) and within +/-3 percent of the optimum moisture content value. Also, a representative of a qualified geotechnical engineer must test the base course material prior to, and during, placement.

Asphaltic binder and surface courses should meet the requirements from Section 460 of the State of Wisconsin Standard Specifications for Construction. Asphaltic courses should be placed and compacted to the minimum required density contained within section 460 of the Standard Specifications. An adequate number of in-place density tests should be performed during construction to document the placement and compaction of the asphalt.

The pavements should be sloped to provide positive surface drainage. Water should not be allowed to pond on or adjacent to the pavement as this could saturate the subgrade and cause premature pavement deterioration. The granular base course should be protected from water inflow along drainage paths. Additionally, the granular base course should extend beyond the edges of the pavement in low areas to allow any water that enters the base course stone a path for exit.

The paved areas are recommended to be constructed with attention to final grades to facilitate drainage. Construction of the subgrade and pavements should be in accordance with the project specifications.

PSI recommends that subsurface drains be installed. If placed properly, subsurface drains will greatly reduce the amount of trapped water under the pavement surfaces. Trapped water leads to subgrade degradation and increases pavement heave during winter months. It is recommended that underdrains be placed within the subgrade, just below the granular base. Minimally, these drains should be placed in low spots in the pavement, at the toe of slopes that are draining toward pavement surfaces, undercuts that have been filled with granular fill, and as finger drains. At a minimum, finger drains should consist of installing 3 to 4 drain tiles extending radially outward, 20 feet from each interior catch basin. In addition, drain tiles should extend along curb lines, 20 feet up the slope from curb inlets. The drain tile should be directly connected to the storm sewer manholes or catch basins. The drain tile should consist of 4-inch diameter perforated PVC pipe placed beneath the base layer, extending at least 8 inches into the subgrade. The pipe should be surrounded by 1-inch size clean stone, with the pipe and stone being wrapped with a geotextile filter fabric to reduce the potential of soils from migrating into

and obstructing the pipe. It is also recommended that roof drains be connected to the storm water collection system to minimize the potential for this water to enter the base and subgrade. Additionally, the drain tile should be installed with a positive slope (minimum ½ to 1 percent) throughout the length of the tile.

Periodic pavement maintenance is required to keep a pavement, under normal traffic and environmental conditions, as near as possible to its constructed condition. Maintenance is necessary to reduce the effects of pavement stress caused by changes in temperature and moisture, repetitive traffic loadings, and movement of the subgrade soils. As pavement distress is observed, it should be repaired as quickly as possible. Unrepaired areas will generally lead to more severe and widespread distress, and eventually, pavement disintegration. Therefore, periodic maintenance consisting of crack sealing, seal coating every 3 to 5 years, and other necessary repairs at least annually, will be required to obtain the design service life.

CONSTRUCTION CONSIDERATIONS

PSI should be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. PSI will not accept any responsibility for any conditions that deviated from those described in this report, nor for the performance of the foundation or pavement if we are not engaged to also provide construction observation and testing for this project.

Moisture Sensitive Soils/Weather-Related Concerns

The soils encountered at this site are expected to be sensitive to disturbances caused by construction traffic and changes in moisture content. Increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

Water should not be allowed to collect in the foundation excavation, on floor slab or pavement areas, or on prepared subgrades during or after construction. Areas should be sloped to facilitate removal of collected rainwater, groundwater, or surface runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of buildings, beneath floor slabs, and within pavement areas. The grades should be sloped away from buildings and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.

Drainage and Groundwater Concerns

Groundwater levels observed within the borings generally ranged between about EL. 24.5

to EL. 18. Based upon an estimated finished floor elevation of EL. 34 feet, the groundwater level observed is not considered to be an issue with the slab-on-grade construction proposed and shallow utilities. However, where over-excavation is performed in the area of foundation or floor slab subgrade to remove existing fill and buried organic soils, these excavations will likely encroach upon or extend below the groundwater level. Where over-excavations encroach upon or extend only several inches below the groundwater, conventional dewatering with a filtered pump and sumps may be sufficient to control the water. However, where excavations extend more than several inches below the groundwater, dewatering with a series of sumps or well-points along with high capacity pumps may be necessary to maintain the water level at least two feet beneath the over-excavation depth to maintain stability. The contractor must determine the site water levels and means and methods for appropriately dewatering excavations prior to bidding and construction.

Fluctuations in the groundwater level should be anticipated throughout the year depending on variations in climatological conditions and other factors not apparent at the time the borings were performed. The possibility of groundwater level fluctuation should be considered when developing the design and construction plans for the project.

Excavations

It is mandated that excavations, whether they be for utility trenches, basement excavations or footing excavations, be constructed in accordance with current Occupational Safety and Health Administration (OSHA) guidelines to protect workers and others during construction. PSI recommends that these regulations be strictly enforced; otherwise, workers could be in danger and the owner(s) and the contractor(s) could be liable for substantial penalties.

Auger refusal was encountered within all the borings except B-15 and B-16 at depths of about 9.5 to 26.5 feet (EL. 26.5 to EL. 9.5). In addition, generally very dense conditions were encountered with increasing depth. Although it is anticipated that foundation excavations and shallow utility excavations will generally remain above these refusal depths, specialized excavation techniques, and/or blasting may be necessary where planned invert and elevations are below refusal depths. It is recommended that additional exploration with backhoe excavated test pits be performed in any areas where it is anticipated that the refusal depths may be present above planned development grades, in order to better evaluate the depth, type, and excavatability of the refusal materials. Also, difficult digging may be experienced with increasing depth due to the general dense nature of the natural soils and the possible presence of cobbles and boulders. Longer excavation times should be expected.

Additionally, concrete rubble, cobbles, and boulders were encountered within the existing fill. Based on the test pits performed, concrete rubble approximately 18 to 24 inches wide was present within some of the building areas, and cobbles/boulders were present throughout the fill materials. At least some difficulty is anticipated with excavations as well as any drilling necessary for foundations, especially where the concrete rubble fill is in a

dense to very dense condition.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

Utility Trenching and Backfilling

In general, the on-site soils can be used for support of utility lines. However, some undercutting of softened, unstable, organic, or otherwise unsuitable soils, in conjunction with the placement of crushed stone or other suitable granular backfill may be necessary (especially within existing fill or organic soils) to establish a stable working mat and/or bearing subgrade. Some difficulty with the stability of utility trenches should be expected due to the presence of fill, especially in the presence of water. The use of sloping, shoring, bracing, or trench boxes will likely be required. Utility construction should be performed in accordance with "The Standard Specifications for Sewer and Water Line Construction" for the State of Wisconsin.

Excavation for utility trenches shall be performed in accordance with OSHA regulations as stated in 29 CFR Part 1926. It should be noted that utility trench excavations have the potential to degrade the properties of the adjacent fill materials. Utility trench walls that are allowed to move laterally can lead to reduced bearing capacity and increased settlement of adjacent structural elements and overlying slabs.

Backfill for utility trenches is as important as the original subgrade preparation or engineered fill placed to support either a foundation or slab. Therefore, it is imperative that the backfill for utility trenches be placed to meet the project specifications for the engineered fill of this project. Unless otherwise specified, the backfill for the utility trenches should be placed in 4 to 6-inch loose lifts and compacted to a minimum of 95 percent of the maximum dry density achieved by the standard Proctor test. The backfill soil should be moisture conditioned to be within 3± percent of the optimum moisture content as determined by the standard Proctor test. Up to 4 inches of bedding material placed directly under the pipes or conduits placed in the utility trench can be compacted to the 90 percent compaction criteria with respect to the standard Proctor.

Compaction testing should be performed for every 200 cubic yards of backfill placed or each lift within 200 linear feet of trench, whichever is less. Backfill of utility trenches should not be performed with water standing in the trench. If granular material is used for

the backfill of the utility trench, the granular material should have a gradation that will filter protect the backfill material from the adjacent soils. If this gradation is not available, a geosynthetic non-woven filter fabric should be used to reduce the potential for the migration of fines into the backfill material. Granular backfill material shall be compacted to meet the above compaction criteria.

GEOTECHNICAL RISK

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding section constitutes PSI's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSI's experience in working with these conditions.

REPORT LIMITATIONS

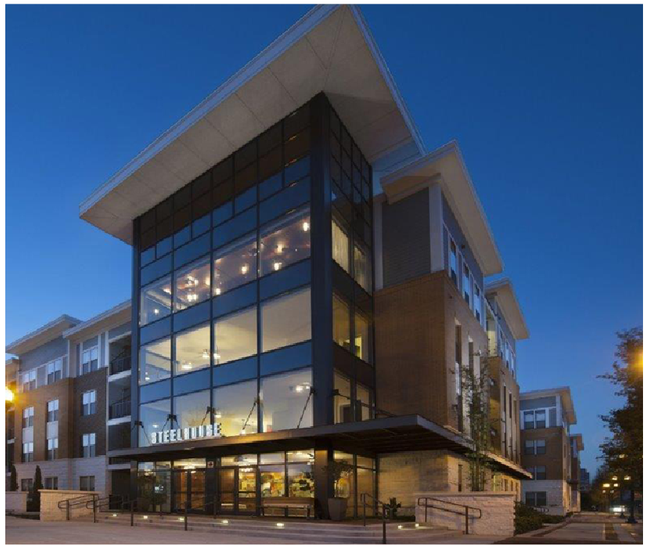
PSI's recommendations are based on the available subsurface information obtained by PSI and design details furnished by others. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI must be notified immediately to determine if changes in the recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project.

PSI warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

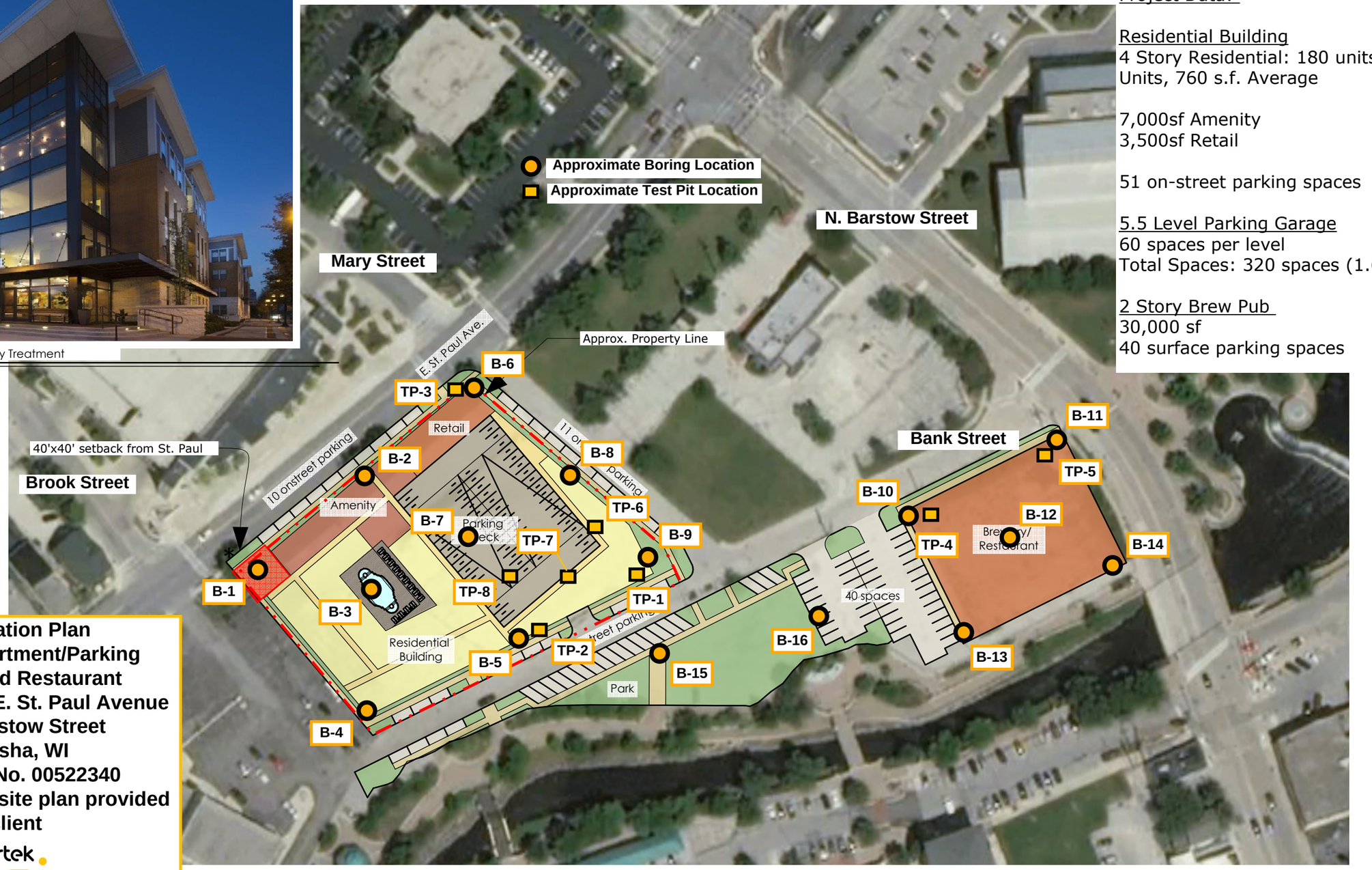
After the plans and specifications are complete, PSI must be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use by Campbell Capital Group for the Proposed Apartment/Parking Structure and Restaurant Development, to be located in Waukesha, Wisconsin.

APPENDIX

TEST LOCATION PLAN
LOG OF BORINGS AND TEST PITS
GENERAL NOTES



* Sample Corner / Lobby Treatment
Illustrative



Test Location Plan
Proposed Apartment/Parking Structure and Restaurant
South Corner of E. St. Paul Avenue and N. Barstow Street
Waukesha, WI
PSI Project No. 00522340
***Developed from site plan provided by client**

intertek psi

Project Data:

Residential Building
4 Story Residential: 180 units
Units, 760 s.f. Average

7,000sf Amenity
3,500sf Retail

51 on-street parking spaces

5.5 Level Parking Garage
60 spaces per level
Total Spaces: 320 spaces (1.6 ratio)

2 Story Brew Pub
30,000 sf
40 surface parking spaces

1 Density Study - Above Podium
Scale: 1" = 100'

N

BORING B-01

DATE STARTED:	4/4/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/4/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	17.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	35 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water		
	While Drilling	13.5 feet
	Upon Completion	Not Obsvd
	Delay	N/A

BORING LOCATION: Apartment Bldg West

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil Fill, Dark Brown Silty Sand, with Root Matter, Moist (6"± Thick)	OL				
				1	12	Fill, Brown Silty Sand and Gravel, with Sandy Lean Clay Pockets, Moist	FILL	9-18-19 N=37	5		
30	5			2	12	Possible Fill, Brown Silty Sand and Gravel, Very Moist	P FILL	5-7-6 N=13	7		
				3	12			5-5-16 N=21	8		
25	10			4	3	Light Brown Silty Fine Sand and Gravel, Moist to Wet	SM	16-25-17 N=42	6		
				5	12			19-19-16 N=35	7		
20	15					End of Boring at 17.5' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock Cave-In at 15'					

intertek psi

Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00522340
PROJECT: Proposed Apartments and Brewery
LOCATION: East St. Paul Avenue, Waukesha, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-02

DATE STARTED:	4/4/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/4/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	26.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	36 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	12 feet
Upon Completion	Not Obsvd
Delay	N/A

BORING LOCATION:
Parking Structure West

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
35	0					Topsoil Fill, Dark Brown Silty Sand, with Root Matter, Moist (6"± Thick)	OL				
				1	16	Fill, Gray and Brown Silty Sand and Gravel, with Sandy Silt and Sandy Clay Pockets, Moist		16-25-23 N=48	4	×	
				2	16		FILL	10-12-13 N=25	6	×	
30	5			3	18			22-25-31 N=56	3	× >>	
				4	12	Light Brown to Brown Silty Sand and Gravel, with Lean Clay Seams, Moist to Wet		26-22-21 N=43	4	×	
25	10										
				5	6			15-19-12 N=31			
20	15						SM				
				6	6			25-25-16 N=41	9	×	
15	20										
				7	10			15-25-50/1"	11	× >>	
10	25					End of Boring at 26.5' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock Cave-In at 15' Boring offset 10' southwest due to tree					

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PROJECT: Proposed Apartments and Brewery
LOCATION: East St. Paul Avenue
Waukesha, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-03

DATE STARTED:	4/4/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/4/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	19.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	30 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water		
	While Drilling	8.5 feet
	Upon Completion	Not Obsvd
	Delay	N/A

BORING LOCATION: Apartment Bldg Center

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0 25 50) STRENGTH, tsf ▲ Qu ✳ Qp (0 2.0 4.0)	Additional Remarks
	0					Asphalt (5"± Thick)	ASPH				
						Aggregate Base, Brown Sand and Gravel, Moist (7"± Thick)	BASE				
				1	3	Fill, Dark Brown Silty Sand and Gravel, with Asphalt Pieces, Moist	FILL	7-7-8 N=15	4		
						Brown Silty Sand and Gravel, with Lean Clay and Silt Seams, with Dark Gray Staining Below 18.5', Moist to Wet					
25	5			2	3			20-46-15 N=61	4		
				3	12			16-16-14 N=30	4		
				4	10			13-10-10 N=20	11		
20	10						SM				
				5	12			10-11-10 N=21	8		
15	15										
				6	10			16-50/3"	14		
						End of Boring at 19.5' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock					
						Cave-In at 10'					

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Telephone: (262) 521-2125

PROJECT NO.: 00522340
PROJECT: Proposed Apartments and Brewery
LOCATION: East St. Paul Avenue, Waukesha, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-04

DATE STARTED:	4/4/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/4/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	16.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	29 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	8.5	feet
Upon Completion	10	feet
Delay	N/A	

BORING LOCATION: Apartment Bldg South

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Asphalt (4"± Thick)	ASPH				
						Aggregate Base, Brown Sand and Gravel, Moist (8"± Thick)	BASE				
				1	6	Fill, Brown and Dark Brown Sandy Silty Clay/Lean Clay, with Gravel, Trace Brick and Concrete Pieces, Very Moist	FILL	4-5-3 N=8	18		
25				2	16	Fill, Brown Lean Clay, Trace Sand and Gravel, Very Moist	FILL	2-2-2 N=4	27		Q_r = 0.7 tsf
	5			3	18	Possible Buried Topsoil, Dark Gray Lean Clay, with Root Matter, Very Moist	OL	2-2-4 N=6	45		Organic Content = 5.1%
						Brown Silty Sand and Gravel, Wet					
20				4	12			19-16-14 N=30	11		
	10						SM				
15				5	3			21-29-50/3"			>>◎
	15					End of Boring at 16' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock					
						Cave-In at 10.5'					

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BORING B-05

DATE STARTED:	4/2/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/2/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	19.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	30 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	12	feet
Upon Completion	9	feet
Delay	N/A	

BORING LOCATION:
Parking Structure South

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					Topsoil Fill, Dark Brown Silty Sand, with Root Matter, Moist (4"± Thick)	OL			
						Fill, Brown Sand and Silty Sand, Trace to with Gravel , Moist	FILL			
				1	12			10-15-13 N=28	5	
						Fill, Brown, Gray, and Black Silty Sand and Gravel, with Crushed Concrete, Wood Pieces and Sandy Silt Pockets, Moist to Very Moist	FILL			
				2	6			5-6-7 N=13	7	
25	5									
						Fill, Black Sandy Silty Clay, with Vegetative Fibers and Gravel, Very Moist				
				3	6		FILL	2-2-7 N=9	29	Organic Content = 9.1%
						Fill, Gray and Dark Gray Silty Sand and Gravel, Very Moist				
				4	12		FILL	11-14-11 N=25	6	
20	10									
						Brown Silty Sand and Gravel, Wet				
				5	18		SM	34-20-17 N=37	11	
15	15									
				6	0			50/5"		>>
						End of Boring at 19' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock				
						Cave-In at 10'				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

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LOCATION: East St. Paul Avenue
Waukesha, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-06

DATE STARTED:	4/4/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/4/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	9.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	36 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water		
	While Drilling	Not Obsvd
	Upon Completion	Not Obsvd
	Delay	N/A

BORING LOCATION: Parking Structure North

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil Fill, Dark Brown Silty Sand, with Root Matter, Moist (6"± Thick)	OL				
35				1	6	Fill, Brown and Gray Silty Sand and Gravel, with Dark Brown Lean Clay and Silt Pockets, Moist		6-7-10 N=17	20		
				2	16		FILL	10-11-20 N=31	12		
	5										
30				3	16			11-16-20 N=36	4		
				4	6	Brown Silty Sand and Gravel, with Silt Seams, Moist	SM	50/1"	3		
						End of Boring at 9.5' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock Cave-In at 6'					

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The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-07

DATE STARTED:	4/2/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/2/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	21.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	31 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	8	feet
Upon Completion	8	feet
Delay	N/A	

BORING LOCATION:
Parking Structure W Center

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
30	0					Topsoil Fill, Dark Brown Silty Sand, with Root Matter (5"± Thick)	OL				
				1	6	Fill, Brown and Dark Brown Silty Sand and Gravel, with Sandy Lean Clay Pockets, Very Moist	FILL	6-9-7 N=16	13		
	5			2	10	Brown Sand and Gravel, Trace to with Silt, with Sandy Silt Seams, Moist	SP-SM	11-21-13 N=34	4		
25				3	12			16-16-36 N=52	6		
				4	6	Brown Silty Sand and Gravel, Wet	SM	13-13-10 N=23	10		
20	10										
				5	18	Black Silty Sand and Gravel, Wet (Possible Petroleum-Type Odor)	SM	15-16-17 N=33	9		
15	15										
				6	16	Light Gray and Light Brown Silty Sand and Gravel, Wet	SM	21-39-36 N=75	12		
10	20					End of Boring at 21.5' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock Cave-In at 10'					

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Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00522340
PROJECT: Proposed Apartments and Brewery
LOCATION: East St. Paul Avenue
Waukesha, WI

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BORING B-08

DATE STARTED:	4/2/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/2/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	23.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	33 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	12	feet
Upon Completion	10	feet
Delay	N/A	

BORING LOCATION:
Parking Structure E Center

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil Fill, Dark Brown Silty Sand, with Root Matter, Very Moist (12"± Thick)	OL				
				1	12	Fill, Brown Sandy Silty Clay, with Gravel, Very Moist	FILL	3-4-3 N=7	18		
30						Fill, Brown Silty Sand and Gravel, with Concrete Pieces, Very Moist					
	5			2	3		FILL	4-2-1 N=3	7		
						Brown Sandy Silt and Gravel, Moist					
				3	16		ML	10-16-14 N=30	6		
25						Brown Silty Sand and Gravel, Moist					
	10			4	16		SM	14-13-13 N=26	5		
						Dark Gray and Black Silty Sand and Gravel, Wet (Possible Faint Petroleum-Type Odor)					
20				5	12		SM	25-25-15 N=40	9		
	15					Gray Silty Sand and Gravel, Wet					
15				6	16		SM	28-16-14 N=30	8		
	20					End of Boring at 23' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock					
10						Cave-In at 10.5'					

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Waukesha, WI 53189
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BORING B-09

DATE STARTED:	4/2/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/2/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	17.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	30 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	12	feet
Upon Completion	10	feet
Delay	N/A	

BORING LOCATION:
Parking Structure East

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					Topsoil Fill, Dark Brown Sandy Clay, with Root Matter, Very Moist (8"± Thick)	OL			
				1	12	Fill, Brown Silty Sand and Gravel, with Sandy Lean Clay Pockets, Trace Crushed Concrete, Very Moist	FILL	4-4-3 N=7	11	
				2	10	Fill, Black Sandy Silt and Gravel, with Crushed Concrete, Very Moist (Possible Coal Cinders and Foundry Slag)	FILL	2-1-2 N=3	13	
25	5			3	6	Possible Buried Topsoil, Black Silty Clay, with Vegetative Fibers, Very Moist	OL	2-2-2 N=4	62	>> Organic Content = 10.1%
						Dark Brown Silt, with Vegetative Fibers, Very Moist	OL			
				4	18			1-13-24 N=37	89	>>
20	10					Gray Silty Sand and Gravel, Wet				
							SM			
				5	12			16-21-18 N=39	7	
15	15									
						End of Boring at 17.5' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock				
						Cave-In at 11'				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
Moisture PL LL
0 25 50
STRENGTH, tsf
Qu Qp
0 2.0 4.0

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LOCATION: East St. Paul Avenue
Waukesha, WI

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BORING B-10

DATE STARTED:	4/3/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/3/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	16.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	32 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	12 feet
Upon Completion	10 feet
Delay	N/A

BORING LOCATION:
Brewery/Restaurant Northwest

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil Fill, Dark Brown Silty Sand, with Root Matter, Moist (12"± Thick)	OL				
30				1	12	Fill, Brown and Dark Brown Lean Clay, with Sand, Gravel, Crushed Concrete, and Brick, Trace Root Matter, Very Moist	FILL	6-14-7 N=21	25		
	5			2	12			2-2-3 N=5	24		
25				3	10	Light Brown to Brown Lean Clay, Trace Sand, Very Moist	CL	2-4-9 N=13	27		
	10			4	10	Brown Silty Sand, Trace Gravel, Moist	SM	10-13-7 N=20	7		
20						Brown Silty Sand and Gravel, with Gray Lean Clay Seams, Wet	SM				
	15			5	16			5-7-9 N=16	10		
						End of Boring at 16' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock Cave-In at 10.5' Boring offset 15' southwest due to overhead electric					

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Waukesha, WI 53189
Telephone: (262) 521-2125

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LOCATION: East St. Paul Avenue
Waukesha, WI

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BORING B-11

DATE STARTED:	4/3/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/3/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	18.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	32 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	8.5	feet
Upon Completion	9	feet
Delay	N/A	

BORING LOCATION:
Brewery/Restaurant Northeast

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil Fill, Dark Brown and Black Silty Sand, with Silty Clay Pockets, Gravel, and Root Matter, Very Moist (12"± Thick)	OL				
30				1	18	Fill, Brown Silty Sand and Gravel, Trace Clay, Very Moist	FILL	6-9-6 N=15	8		
				2	16	Fill, Brown Sandy Lean Clay, with Silty Sand and Gravel Pockets, Very Moist		9-4-5 N=9	17		
25	5			3	0		FILL	50/3"		>>	
				4	12	Brown Lean Clay with Sand Pockets, Wet	CL	4-3-3 N=6	20		
20	10										
				5	16	Brown Silty Sand and Gravel, Wet	SM	15-13-16 N=29	10		
15	15										
						End of Boring at 18.5' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock Cave-In at 10' Boring offset 20' south due to overhead electric					

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821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

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LOCATION: East St. Paul Avenue, Waukesha, WI

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BORING B-12

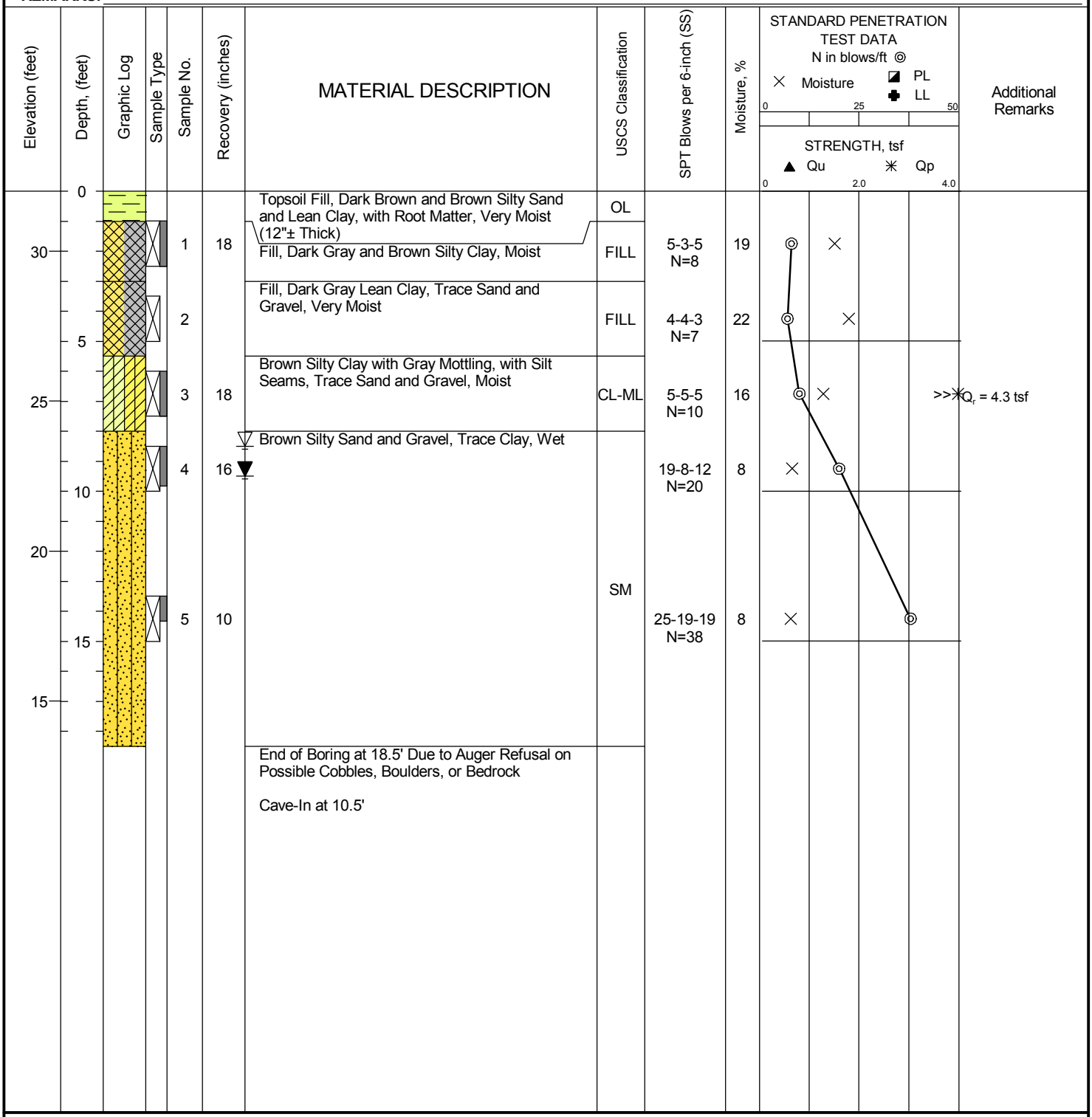
DATE STARTED:	4/3/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/3/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	18.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	32 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	8.5	feet
Upon Completion	9.5	feet
Delay	N/A	

BORING LOCATION:
Brewery/Restaurant Center



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821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00522340
PROJECT: Proposed Apartments and Brewery
LOCATION: East St. Paul Avenue, Waukesha, WI

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BORING B-13

DATE STARTED:	4/3/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/3/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	19.5 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	32 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	8	feet
Upon Completion	10	feet
Delay	N/A	

BORING LOCATION:
Brewery/Restaurant Southwest

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil Fill, Dark Brown Silty Sand, with Root Matter, Moist (6"± Thick)	OL				
30				1	2	Fill, Brown and Dark Brown Silty Sand and Gravel, with Root Matter and Plastic, Moist	FILL	14-50/4"		>>◎	
	5			2	16	Fill, Black Sandy Lean Clay, with Gravel, Very Moist (Possible Foundry Materials)	FILL	2-3-2 N=5	23	×	
25				3	6	Fill, Dark Brown Sandy Lean Clay, with Gravel, Brick, and Concrete, Very Moist	FILL	2-1-2 N=3	25	◎ ×	
	10			4	6	Brown Silty Sand and Gravel, with Lean Clay Seams, Wet		6-7-8 N=15	12	× ◎	
20							SM				
	15			5	16			27-33-21 N=54	7	×	>>◎
15				6	6			14-20-50/3"	8	×	>>◎
						End of Boring at 19.5' Due to Auger Refusal on Probable Cobbles and Boulders Cave-In at 10.5'					

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821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00522340
PROJECT: Proposed Apartments and Brewery
LOCATION: East St. Paul Avenue
Waukesha, WI

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BORING B-14

DATE STARTED:	4/3/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/3/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	18.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	33 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	8.5 feet
Upon Completion	10 feet
Delay	N/A

BORING LOCATION:
Brewery/Restaurant Southeast

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Topsoil Fill, Dark Brown Silty Sand, with Silty Clay and Root Matter, Moist (12"± Thick)	OL				
				1	16	Fill, Brown and Gray Silty Sand and Gravel, with Crushed Concrete and Lean Clay Pockets, Moist	FILL	2-4-6 N=10	8		
30											
				2	10	Fill, Brown, Dark Brown, and Black Sandy Lean Clay, with Gravel, Very Moist		4-2-2 N=4	18		
	5						FILL				
				3	12			6-4-7 N=11	23		
25											
						Brown Silty Fine Sand with Gravel, Wet ▽					
				4	16	▼		4-8-11 N=19	13		
	10						SM				
						Gray Silty Sand and Gravel, Wet					
20											
				5	3			50/3"	8	>>	
	15						SM				
15						End of Boring at 18' Due to Auger Refusal on Possible Cobbles, Boulders, or Bedrock					
						Cave-In at 10.5'					

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Waukesha, WI 53189
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PROJECT: Proposed Apartments and Brewery
LOCATION: East St. Paul Avenue
Waukesha, WI

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BORING B-15

DATE STARTED:	4/2/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/2/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	30 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	12	feet
Upon Completion	9	feet
Delay	N/A	

BORING LOCATION: Pavement

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0			Asphalt (4"± Thick)	ASPH			
				Aggregate Base, Light Brown Sand and Gravel, Moist (8"± Thick)	BASE			
		1	12	Fill, Black Silty Sand, with Slag and Brick, Very Moist (Possible Foundry Sand)	FILL	3-4-3 N=7	18	
				Possible Buried Topsoil, Black Silty Clay, with Root Matter, Very Moist				
25	5	2	12		OL	2-2-1 N=3	37	Organic Content = 16.6%
		3	18	Brown Silty Sand and Gravel, with Coarse Sand Seams, Very Moist to Wet		3-5-6 N=11	20	
		4	12			19-16-7 N=23	9	
20	10				SM			
		5	1			50/1"		
15	15			End of Boring at 15'				
				Cave-In at 10'				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

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LOCATION: East St. Paul Avenue
Waukesha, WI

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BORING B-16

DATE STARTED:	4/3/19	**DRILL COMPANY:**	Groundbreaking Exploration, Inc.
DATE COMPLETED:	4/3/19	**DRILLER:** Jonathan	**LOGGED BY:** Jason
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	31 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:	43.0132°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-88.2314°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	BB

REMARKS:

Water

While Drilling	12	feet
Upon Completion	9	feet
Delay	N/A	

BORING LOCATION: Pavement

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Asphalt (3"± Thick)	ASPH				
30						Aggregate Base, Brown Sand and Gravel, Moist (9"± Thick)	BASE				
				1	6	Fill, Brown and Gray Crushed Concrete and Brick, Very Moist to Moist	FILL	31-50/3"	6	× >>◎	
				2	12	Possible Buried Topsoil, Black and Brown Lean Clay, Trace Root Matter, Very Moist	OL	4-2-2 N=4	34	◎ ×	
	5										
25				3	18	Dark Gray Lean Clay, with Root Matter, Very Moist	OL	1-2-2 N=4	84	◎ ✳ >>×	
				4	6	Dark Brown Silt, with Vegetative Fibers, Very Moist	OL	5-2-5 N=7	51	◎ >>×	
	10										
20						Gray Silty Sand and Gravel, Wet	SM				
				5	1			50/3"		>>◎	
	15					End of Boring at 15'					
						Cave-In at 11'					

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Waukesha, WI 53189
Telephone: (262) 521-2125

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PROJECT: Proposed Apartments and Brewery
LOCATION: East St. Paul Avenue, Waukesha, WI

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821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125
Fax: (262) 521-2471

LOG OF TP-01

PSI Job No.: 00522340-TP
Project: Proposed Apartments and Brewery
Location: East St. Paul Avenue
Waukesha, WI

Excavation Method: Mini Excavator
Sampling Method: Bucket
DCP Type:
Boring Location: Adjacent to B-9 - Parking Structure East

WATER LEVELS

While Drilling	Not Obsvd
Upon Completion	Not Obsvd
Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Dynamic Cone (DCP) Blows per -inch	Moisture, %	DYNAMIC CONE PENETRATION TEST DATA Blows per -inch ◎ (0 / 15 / 30); Moisture ✕ PL ◪ LL ✚ (0 / 25 / 50); STRENGTH, tsf ▲ Qu ✳ Qp (0 / 2.0 / 4.0)	Additional Remarks
	0					**Surface Elev.:** 30 ft					
						Topsoil Fill (8"± Thick)	OL				
	1					Fill, Brown Silty Sand and Gravel, with Sandy Lean Clay Pockets and Concrete Pieces (up to about 24" wide), Very Moist	FILL				
28	2										
	3					Fill, Black Silty Sand and Gravel, with Possible Coal Cinders, Posible Foundry Slag, and Concrete Pieces, Very Moist					
26	4										
	5						FILL				
24	6										
	7					Possible Buried Topsoil, Black Silty Clay, with Vegetative Fibers, Very Moist	OL				>>◎ Organic Content = 17.6%
22	8					Brown Organic Fibrous Silt, Very Moist					
	9						OL				>>◎ Organic Content = 23.9%
20	10					Gray Silty Sand and Gravel, with Cobbles and Boulders, Very Moist	SM				
						End of Test Pit at 10.5' Due to Difficult Excavation in Cobbles and Boulders					

Completion Depth: 10.5 ft
Date Boring Started: 5/9/19
Date Boring Completed: 5/9/19
Logged By: BB
Excavation Contractor: R&W

Sample Types:
Shelby Tube
Dynamic Cone (DCP)
Grab Sample

Latitude: 43.0132°
Longitude: -88.2314°
Excavation Equipment:
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.

Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125
Fax: (262) 521-2471

LOG OF TP-02

PSI Job No.: 00522340-TP
Project: Proposed Apartments and Brewery
Location: East St. Paul Avenue
Waukesha, WI

Excavation Method: Mini Excavator
Sampling Method: Bucket
DCP Type:
Boring Location: Adjacent to B-5 - Parking Structure South

WATER LEVELS

While Drilling	Not Obsvd
Upon Completion	Not Obsvd
Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Dynamic Cone (DCP) Blows per -inch	Moisture, %	DYNAMIC CONE PENETRATION TEST DATA Blows per -inch ◎ 0 15 30 / Moisture PL LL 0 25 50 / STRENGTH, tsf Qu Qp 0 2.0 4.0	Additional Remarks
	0					**Surface Elev.:** 30 ft Topsoil Fill (4"± Thick)	OL				
	1					Fill, Brown, Gray, and Black Silty Sand/Sand and Gravel, with Concrete Slab Pieces (up to about 24" wide), Bricks, Cobbles, and Boulders, Very Moist					
28	2										
	3										
26	4						FILL				
	5										
24	6										
	7										
22	8										
	9					Fill, Gray Silty Sand and Gravel with Cobbles and Boulders, Very Moist	FILL				
						End of Test Pit at 9' Due to Difficult Excavation in Cobbles and Boulders					

Completion Depth: 9.0 ft
Date Boring Started: 5/9/19
Date Boring Completed: 5/9/19
Logged By: BB
Excavation Contractor: R&W

Sample Types:
Shelby Tube
Dynamic Cone (DCP)
Grab Sample

Latitude: 43.0132°
Longitude: -88.2314°
Excavation Equipment:
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.

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Telephone: (262) 521-2125
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LOG OF TP-03

PSI Job No.: 00522340-TP
Project: Proposed Apartments and Brewery
Location: East St. Paul Avenue
Waukesha, WI

Excavation Method: Mini Excavator
Sampling Method: Bucket
DCP Type:
Boring Location: Adjacent to B-6 - Parking Structure North

WATER LEVELS

While Drilling		Not Obsvd
Upon Completion		Not Obsvd
Delay		N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Dynamic Cone (DCP) Blows per -inch	Moisture, %	DYNAMIC CONE PENETRATION TEST DATA Blows per -inch ◎ (0 / 15 / 30); Moisture ✕ PL ◪ LL ✚ (0 / 25 / 50); STRENGTH, tsf ▲ Qu ✳ Qp (0 / 2.0 / 4.0)	Additional Remarks
	0					**Surface Elev.:** 36 ft Topsoil Fill (6"± Thick)	OL				
	1					Fill, Brown and Gray Silty Sand and Gravel, with Concrete Pieces (up to about 18" wide), Cobbles, and Boulders, Very Moist					
34	2										
	3										
32	4						FILL				
	5										
30	6										
	7					End of Test Pit at 7' Due to Difficult Excavation in Cobbles and Boulders					

Completion Depth: 7.0 ft
Date Boring Started: 5/9/19
Date Boring Completed: 5/9/19
Logged By: BB
Excavation Contractor: R&W

Sample Types:
Shelby Tube
Dynamic Cone (DCP)
Grab Sample

Latitude: 43.0132°
Longitude: -88.2314°
Excavation Equipment:
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.

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Waukesha, WI 53189
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Fax: (262) 521-2471

LOG OF TP-04

PSI Job No.: 00522340-TP
Project: Proposed Apartments and Brewery
Location: East St. Paul Avenue
Waukesha, WI

Excavation Method: Mini Excavator
Sampling Method: Bucket
DCP Type:
Boring Location: Adjacent to B-10 - Brewery/Restaurant NW

WATER LEVELS

While Drilling	Not Obsvd
Upon Completion	Not Obsvd
Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Dynamic Cone (DCP) Blows per -inch	Moisture, %	DYNAMIC CONE PENETRATION TEST DATA Blows per -inch ◎ (0 / 15 / 30); Moisture ✕ PL ◪ LL (0 / 25 / 50); STRENGTH, tsf ▲ Qu ✳ Qp (0 / 2.0 / 4.0)	Additional Remarks
	0					**Surface Elev.:** 32 ft					
						Topsoil Fill (12"± Thick)	OL				
	1					Fill, Brown, Dark Brown, and Gray Lean Clay, with Sand, Gravel, Brick, Concrete Pieces (up to about 18" in diameter), Cobbles, and Boulders, Very Moist					
30	2										
	3						FILL				
28	4										
	5										
26	6										
	7					Light Brown, Brown, and Gray Mottled Lean Clay, Very Moist	CL				
24	8					End of Test Pit at 8' Due to Difficult Excavation in Cobbles and Boulders					

Completion Depth: 8.0 ft
Date Boring Started: 5/9/19
Date Boring Completed: 5/9/19
Logged By: BB
Excavation Contractor: R&W

Sample Types:
Shelby Tube
Dynamic Cone (DCP)
Grab Sample

Latitude: 43.0132°
Longitude: -88.2314°
Excavation Equipment:
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.

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Fax: (262) 521-2471

LOG OF TP-05

PSI Job No.: 00522340-TP
Project: Proposed Apartments and Brewery
Location: East St. Paul Avenue
Waukesha, WI

Excavation Method: Mini Excavator
Sampling Method: Bucket
DCP Type:
Boring Location: Adjacent to B-11 - Brewery/Restaurant NE

WATER LEVELS

While Drilling	Not Obsvd
Upon Completion	Not Obsvd
Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Dynamic Cone (DCP) Blows per -inch	Moisture, %	DYNAMIC CONE PENETRATION TEST DATA Blows per -inch ◎ 0 15 30; Moisture ✕ PL ◪ LL ✚ 0 25 50; STRENGTH, tsf ▲ Qu ✳ Qp 0 2.0 4.0	Additional Remarks
	0					**Surface Elev.:** 32 ft Topsoil Fill (12"± Thick)	OL				
	1					Fill, Brown Silty Sand and Gravel, Very Moist	FILL				
30	2					Fill, Brown Silty Sand and Gravel, with Sandy Lean Clay, Cobbles, and Boulders, Very Moist					
	3										
28	4						FILL				
	5										
26	6					End of Test Pit at 6' Due to Difficult Excavation in Cobbles and Boulders					

Completion Depth: 6.0 ft
Date Boring Started: 5/9/19
Date Boring Completed: 5/9/19
Logged By: BB
Excavation Contractor: R&W

Sample Types:
Shelby Tube
Dynamic Cone (DCP)
Grab Sample

Latitude: 43.0132°
Longitude: -88.2314°
Excavation Equipment:
Remarks:

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Fax: (262) 521-2471

LOG OF TP-06

PSI Job No.: 00522340-TP
Project: Proposed Apartments and Brewery
Location: East St. Paul Avenue
Waukesha, WI

Excavation Method: Mini Excavator
Sampling Method: Bucket
DCP Type:
Boring Location: Parking Structure

WATER LEVELS

While Drilling	Not Obsvd
Upon Completion	Not Obsvd
Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Dynamic Cone (DCP) Blows per -inch	Moisture, %	DYNAMIC CONE PENETRATION TEST DATA Blows per -inch ◎ 0 15 30; Moisture ✕ PL ◪ LL ✚ 0 25 50; STRENGTH, tsf ▲ Qu ✳ Qp 0 2.0 4.0	Additional Remarks
	0					**Surface Elev.:** 31 ft Topsoil Fill (6"± Thick)	OL				
30	1					Fill, Light Brown Silty Sand and Gravel, Moist	FILL				
	2					Fill, Black Possible Coal Cinders, with Brick and Possible Foundry Slag, Very Moist					
28	3										
	4						FILL				
26	5										
	6										
						Brown Lean Clay, Very Moist					
24	7						CL				
						Light Brown Silty Sand and Gravel with Cobbles and Boulders	SM				
	8					End of Test Pit at 8' Due to Difficult Excavation in Cobbles and Boulders					

Completion Depth: 8.0 ft
Date Boring Started: 5/9/19
Date Boring Completed: 5/9/19
Logged By: BB
Excavation Contractor: R&W

Sample Types:
Shelby Tube
Dynamic Cone (DCP)
Grab Sample

Latitude: 43.0132°
Longitude: -88.2314°
Excavation Equipment:
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.

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LOG OF TP-07

PSI Job No.: 00522340-TP
Project: Proposed Apartments and Brewery
Location: East St. Paul Avenue
Waukesha, WI

Excavation Method: Mini Excavator
Sampling Method: Bucket
DCP Type:
Boring Location: Parking Structure

WATER LEVELS

While Drilling	Not Obsvd
Upon Completion	Not Obsvd
Delay	N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Dynamic Cone (DCP) Blows per -inch	Moisture, %	DYNAMIC CONE PENETRATION TEST DATA Blows per -inch ◎ (0 / 15 / 30); Moisture × ; PL ◪ ; LL ✚ (0 / 25 / 50); STRENGTH, tsf ▲ Qu ✳ Qp (0 / 2.0 / 4.0)	Additional Remarks
	0					**Surface Elev.:** 30 ft					
						Topsoil Fill (6"± Thick)	OL				
	1					Fill, Light Brown Silty Sand and Gravel, with Cobbles and Boulders, Moist	FILL				
28	2										
	3					Fill, Gray and Black Silty Sand and Gravel, with Cobbles and Boulders, Very Moist					
26	4										
	5						FILL				
24	6					Fill, Black Lean Clay, with Root Matter and Intermixed Brown Lean Clay, Very Moist					
	7										
							FILL		45	×◎	Organic Content = 12.7
22	8										
	9					Gray Silty Sand and Gravel, with Cobbles and Boulders	SM				
						End of Test Pit at 9.5' Due to Difficult Excavation in Cobbles and Boulders					

Completion Depth: 9.5 ft
Date Boring Started: 5/9/19
Date Boring Completed: 5/9/19
Logged By: BB
Excavation Contractor: R&W

Sample Types:
Shelby Tube
Dynamic Cone (DCP)
Grab Sample

Latitude: 43.0132°
Longitude: -88.2314°
Excavation Equipment:
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.

Professional Service Industries, Inc.
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Waukesha, WI 53189
Telephone: (262) 521-2125
Fax: (262) 521-2471

LOG OF TP-08

PSI Job No.: 00522340-TP
Project: Proposed Apartments and Brewery
Location: East St. Paul Avenue
Waukesha, WI

Excavation Method: Mini Excavator
Sampling Method: Bucket
DCP Type:
Boring Location: Parking Structure

WATER LEVELS

While Drilling	Not Obsvd
Upon Completion	Not Obsvd
Delay	N/A

Elevation (feet)	Depth, (feet)	Material Description	USCS Classification	Moisture, %	Additional Remarks
	0	**Surface Elev.:** 30 ft			
	0	Topsoil Fill (6"± Thick)	OL		
	1	Fill, Light Brown Silty Sand and Gravel, Very Moist	FILL		
28	2	Fill, Black Possible Coal Cinders and Possible Foundry Slag, Very Moist			
	3				
26	4		FILL		
	5				
24	6	Possible Buried Topsoil, Black Lean Clay, with Root Matter, Very Moist			
	7		OL	48	>>◎ Organic Content = 10.3%
22	8	Brown Organic Fibrous Silt, Very Moist			
	9		OL	134	>>⊗ Organic Content = 32.7%
20	10	Gray Silty Sand and Gravel, with Cobbles and Boulders, Very Moist	SM		
		End of Test Pit at 10' Due to Difficult Excavation in Cobbles and Boulders			

DYNAMIC CONE PENETRATION TEST DATA
Blows per -inch ◎ (0, 15, 30)
Moisture ✕ / PL ◪ / LL ✚ (0, 25, 50)
STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)

Completion Depth:	10.0 ft
Date Boring Started:	5/9/19
Date Boring Completed:	5/9/19
Logged By:	BB
Excavation Contractor:	R&W

Sample Types:
Shelby Tube
Dynamic Cone (DCP)
Grab Sample

Latitude: 43.0132°
Longitude: -88.2314°
Excavation Equipment:
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
RC: Rock Core
TC: Texas Cone
BS: Bulk Sample
PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼,▽,▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

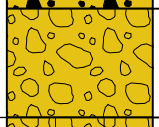
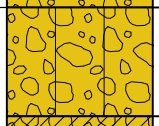
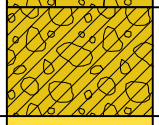
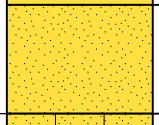
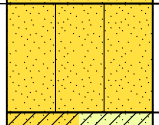
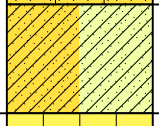
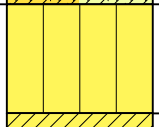
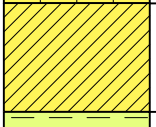
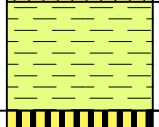
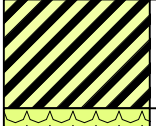
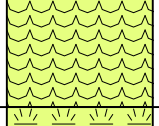
Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

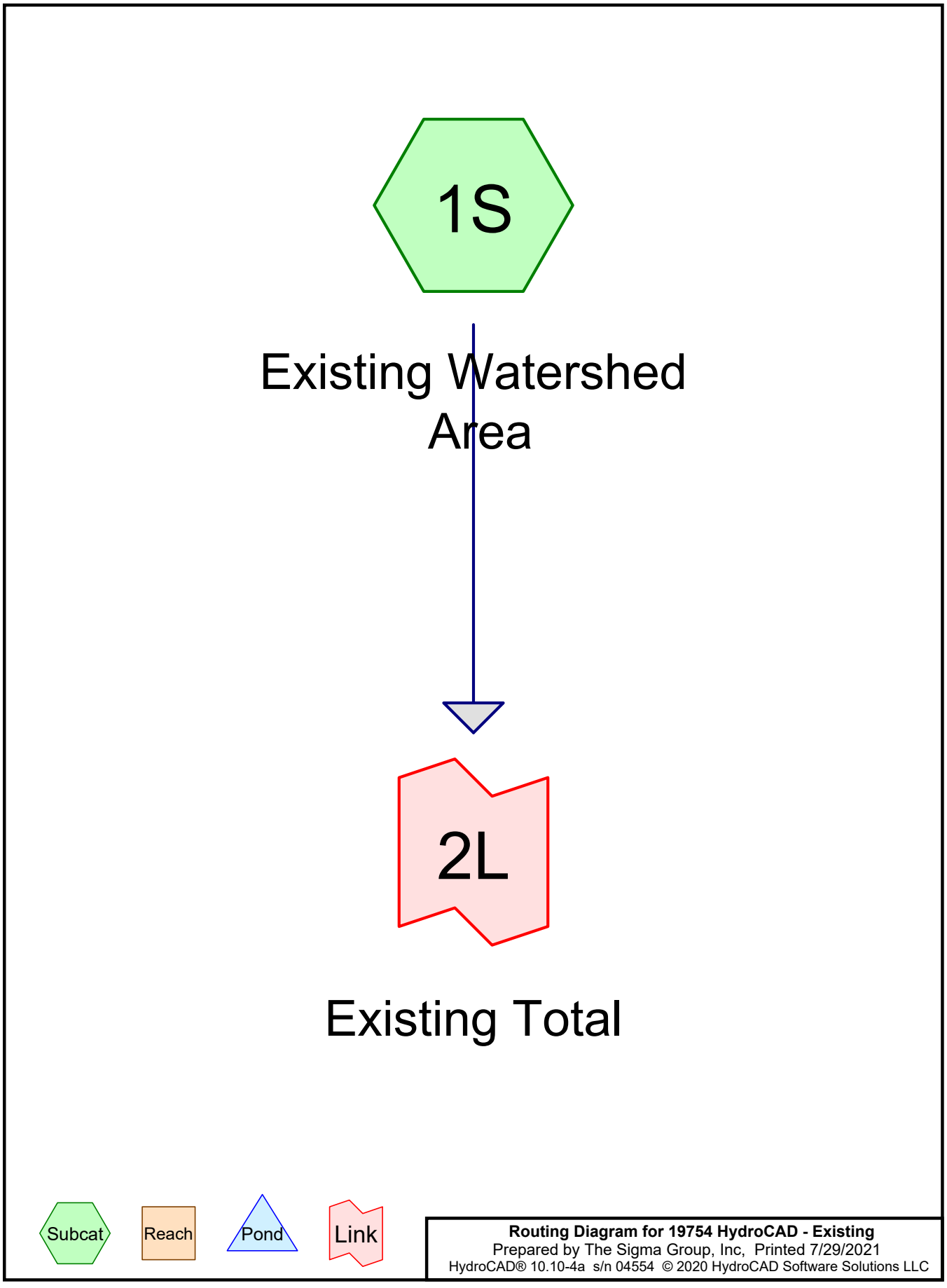
NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

intertek psi

APPENDIX B

STORM WATER QUANTITY (HYDROCAD) MODELING



Routing Diagram for 19754 HydroCAD - Existing
Prepared by The Sigma Group, Inc, Printed 7/29/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 Year	MSE 24-hr	3	Default	24.00	1	2.40	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.449	84	50-75% Grass cover, Fair, HSG D (1S)
2.332	98	Paved parking, HSG D (1S)
3.781	**93**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.781	HSG D	1S
0.000	Other	
3.781		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.449	0.000	1.449	50-75% Grass cover, Fair	1S
0.000	0.000	0.000	2.332	0.000	2.332	Paved parking	1S
0.000	**0.000**	**0.000**	**3.781**	**0.000**	**3.781**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Watershed Runoff Area=164,700 sf 61.69% Impervious Runoff Depth>1.63"
Tc=6.0 min CN=93 Runoff=10.97 cfs 0.512 af

Link 2L: Existing Total Inflow=10.97 cfs 0.512 af
Primary=10.97 cfs 0.512 af

Total Runoff Area = 3.781 ac Runoff Volume = 0.512 af Average Runoff Depth = 1.63"
38.31% Pervious = 1.449 ac 61.69% Impervious = 2.332 ac

Summary for Subcatchment 1S: Existing Watershed Area

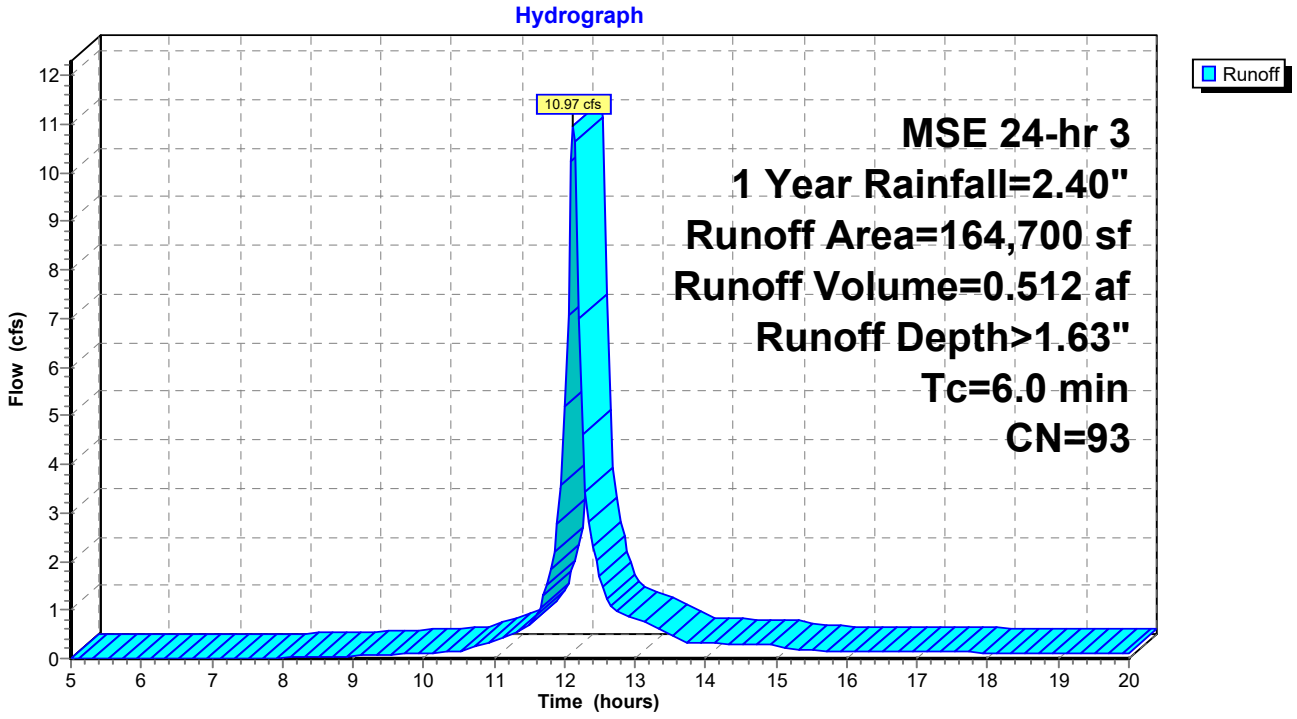
Runoff = 10.97 cfs @ 12.13 hrs, Volume= 0.512 af, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

Area (sf)	CN	Description
101,600	98	Paved parking, HSG D
63,100	84	50-75% Grass cover, Fair, HSG D
164,700	93	Weighted Average
63,100		38.31% Pervious Area
101,600		61.69% Impervious Area

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

Subcatchment 1S: Existing Watershed Area



Hydrograph for Subcatchment 1S: Existing Watershed Area

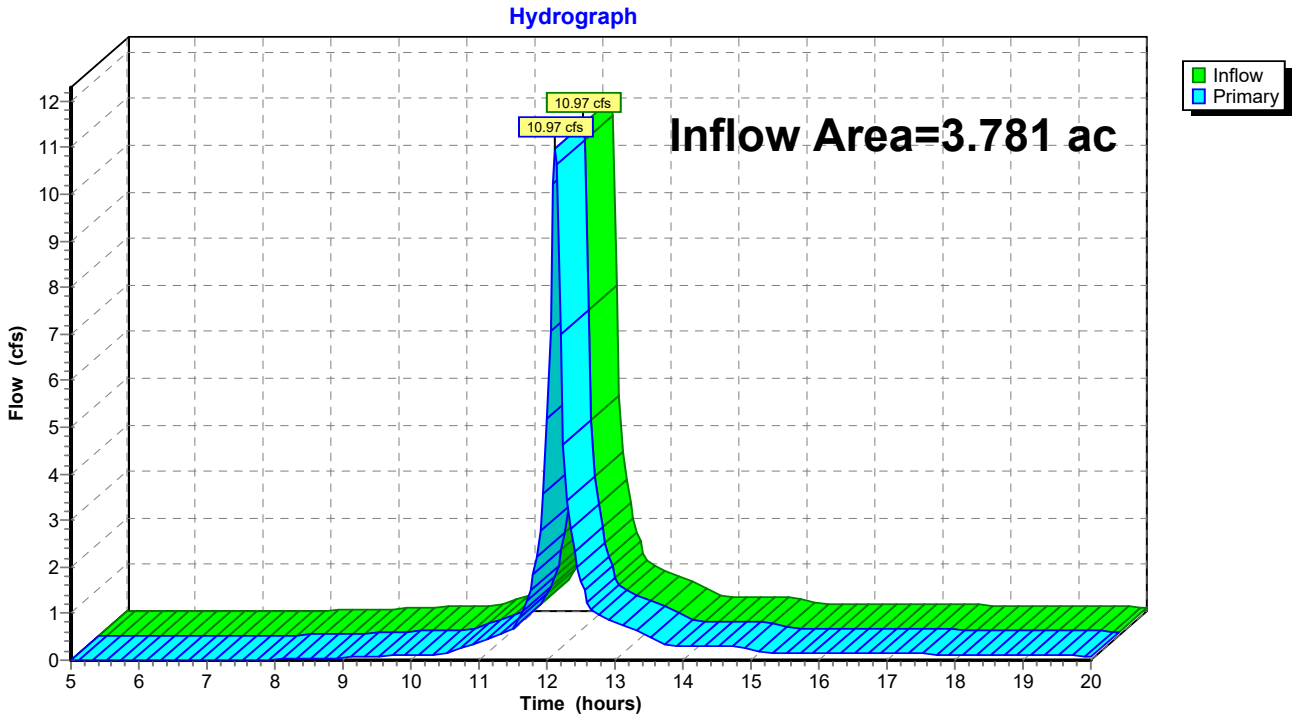
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.00	0.00
5.25	0.10	0.00	0.00
5.50	0.11	0.00	0.00
5.75	0.11	0.00	0.00
6.00	0.12	0.00	0.00
6.25	0.13	0.00	0.00
6.50	0.14	0.00	0.00
6.75	0.15	0.00	0.00
7.00	0.16	0.00	0.00
7.25	0.17	0.00	0.01
7.50	0.18	0.00	0.01
7.75	0.19	0.00	0.01
8.00	0.20	0.00	0.02
8.25	0.21	0.00	0.02
8.50	0.22	0.01	0.03
8.75	0.24	0.01	0.03
9.00	0.25	0.01	0.04
9.25	0.27	0.02	0.07
9.50	0.29	0.02	0.08
9.75	0.31	0.03	0.10
10.00	0.33	0.03	0.11
10.25	0.35	0.04	0.13
10.50	0.38	0.05	0.14
10.75	0.41	0.07	0.26
11.00	0.46	0.09	0.37
11.25	0.52	0.12	0.50
11.50	0.60	0.17	0.66
11.75	0.74	0.26	1.50
12.00	1.11	0.54	**5.18**
12.25	1.66	1.01	**4.62**
12.50	1.80	1.14	1.71
12.75	1.88	1.20	0.98
13.00	1.94	1.26	0.82
13.25	1.99	1.30	0.67
13.50	2.02	1.34	0.51
13.75	2.05	1.36	0.32
14.00	2.07	1.38	0.31
14.25	2.09	1.40	0.30
14.50	2.11	1.42	0.29
14.75	2.13	1.44	0.28
15.00	2.15	1.46	0.27
15.25	2.16	1.47	0.17
15.50	2.18	1.48	0.17
15.75	2.19	1.49	0.16
16.00	2.20	1.50	0.16
16.25	2.21	1.51	0.15
16.50	2.22	1.52	0.15
16.75	2.23	1.53	0.15
17.00	2.24	1.54	0.14
17.25	2.25	1.55	0.14
17.50	2.26	1.55	0.13
17.75	2.27	1.56	0.13
18.00	2.28	1.57	0.12
18.25	2.29	1.58	0.12
18.50	2.29	1.59	0.12
18.75	2.30	1.59	0.11
19.00	2.31	1.60	0.11
19.25	2.32	1.61	0.10
19.50	2.32	1.61	0.10
19.75	2.33	1.62	0.10
20.00	**2.34**	**1.63**	0.09

Summary for Link 2L: Existing Total

Inflow Area = 3.781 ac, 61.69% Impervious, Inflow Depth > 1.63" for 1 Year event
Inflow = 10.97 cfs @ 12.13 hrs, Volume= 0.512 af
Primary = 10.97 cfs @ 12.13 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.0 min

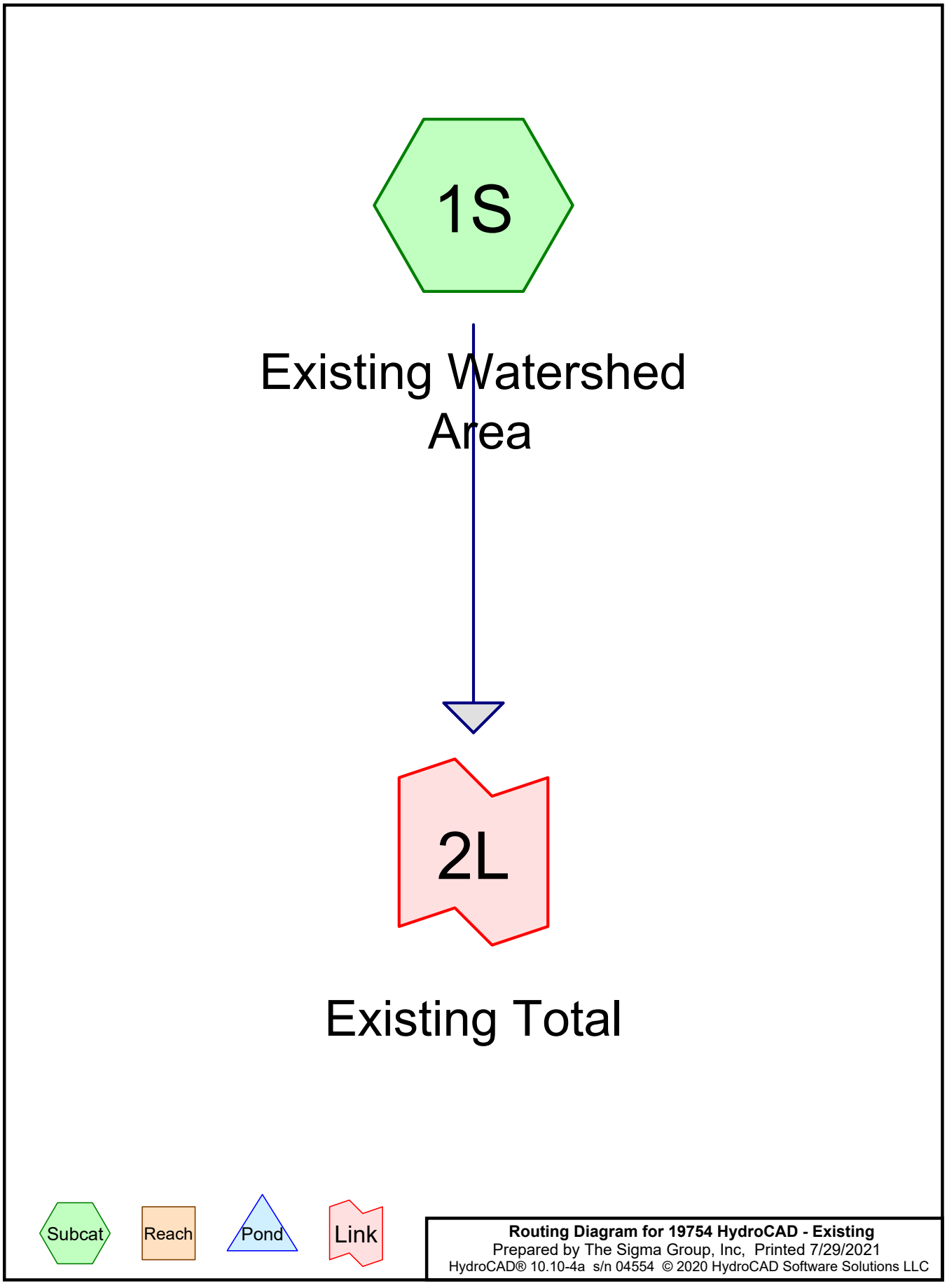
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Existing Total



Hydrograph for Link 2L: Existing Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	**0.00**	0.00
5.25	0.00	0.00	0.00
5.50	0.00	0.00	0.00
5.75	0.00	0.00	0.00
6.00	0.00	0.00	0.00
6.25	0.00	0.00	0.00
6.50	0.00	0.00	0.00
6.75	0.00	0.00	0.00
7.00	0.00	0.00	0.00
7.25	0.01	0.00	0.01
7.50	0.01	0.00	0.01
7.75	0.01	0.00	0.01
8.00	0.02	0.00	0.02
8.25	0.02	0.00	0.02
8.50	0.03	0.00	0.03
8.75	0.03	0.00	0.03
9.00	0.04	0.00	0.04
9.25	0.07	0.00	0.07
9.50	0.08	0.00	0.08
9.75	0.10	0.00	0.10
10.00	0.11	0.00	0.11
10.25	0.13	0.00	0.13
10.50	0.14	0.00	0.14
10.75	0.26	0.00	0.26
11.00	0.37	0.00	0.37
11.25	0.50	0.00	0.50
11.50	0.66	0.00	0.66
11.75	1.50	0.00	1.50
12.00	**5.18**	0.00	**5.18**
12.25	**4.62**	0.00	**4.62**
12.50	1.71	0.00	1.71
12.75	0.98	0.00	0.98
13.00	0.82	0.00	0.82
13.25	0.67	0.00	0.67
13.50	0.51	0.00	0.51
13.75	0.32	0.00	0.32
14.00	0.31	0.00	0.31
14.25	0.30	0.00	0.30
14.50	0.29	0.00	0.29
14.75	0.28	0.00	0.28
15.00	0.27	0.00	0.27
15.25	0.17	0.00	0.17
15.50	0.17	0.00	0.17
15.75	0.16	0.00	0.16
16.00	0.16	0.00	0.16
16.25	0.15	0.00	0.15
16.50	0.15	0.00	0.15
16.75	0.15	0.00	0.15
17.00	0.14	0.00	0.14
17.25	0.14	0.00	0.14
17.50	0.13	0.00	0.13
17.75	0.13	0.00	0.13
18.00	0.12	0.00	0.12
18.25	0.12	0.00	0.12
18.50	0.12	0.00	0.12
18.75	0.11	0.00	0.11
19.00	0.11	0.00	0.11
19.25	0.10	0.00	0.10
19.50	0.10	0.00	0.10
19.75	0.10	0.00	0.10
20.00	0.09	0.00	0.09



Routing Diagram for 19754 HydroCAD - Existing
Prepared by The Sigma Group, Inc, Printed 7/29/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 Year	MSE 24-hr	3	Default	24.00	1	2.70	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.449	84	50-75% Grass cover, Fair, HSG D (1S)
2.332	98	Paved parking, HSG D (1S)
3.781	**93**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.781	HSG D	1S
0.000	Other	
3.781		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.449	0.000	1.449	50-75% Grass cover, Fair	1S
0.000	0.000	0.000	2.332	0.000	2.332	Paved parking	1S
0.000	**0.000**	**0.000**	**3.781**	**0.000**	**3.781**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Watershed Runoff Area=164,700 sf 61.69% Impervious Runoff Depth>1.90"
Tc=6.0 min CN=93 Runoff=12.70 cfs 0.599 af

Link 2L: Existing Total Inflow=12.70 cfs 0.599 af
Primary=12.70 cfs 0.599 af

Total Runoff Area = 3.781 ac Runoff Volume = 0.599 af Average Runoff Depth = 1.90"
38.31% Pervious = 1.449 ac 61.69% Impervious = 2.332 ac

Summary for Subcatchment 1S: Existing Watershed Area

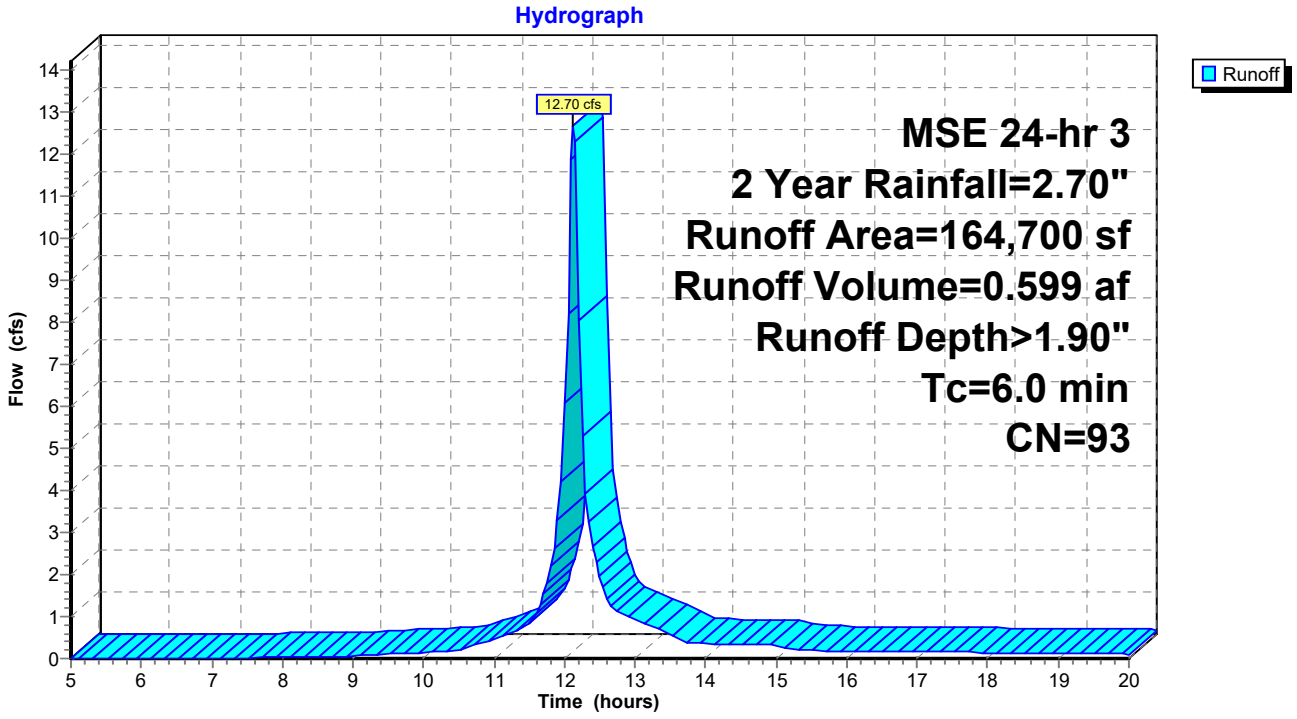
Runoff = 12.70 cfs @ 12.13 hrs, Volume= 0.599 af, Depth> 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

Area (sf)	CN	Description
101,600	98	Paved parking, HSG D
63,100	84	50-75% Grass cover, Fair, HSG D
164,700	93	Weighted Average
63,100		38.31% Pervious Area
101,600		61.69% Impervious Area

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

Subcatchment 1S: Existing Watershed Area



Hydrograph for Subcatchment 1S: Existing Watershed Area

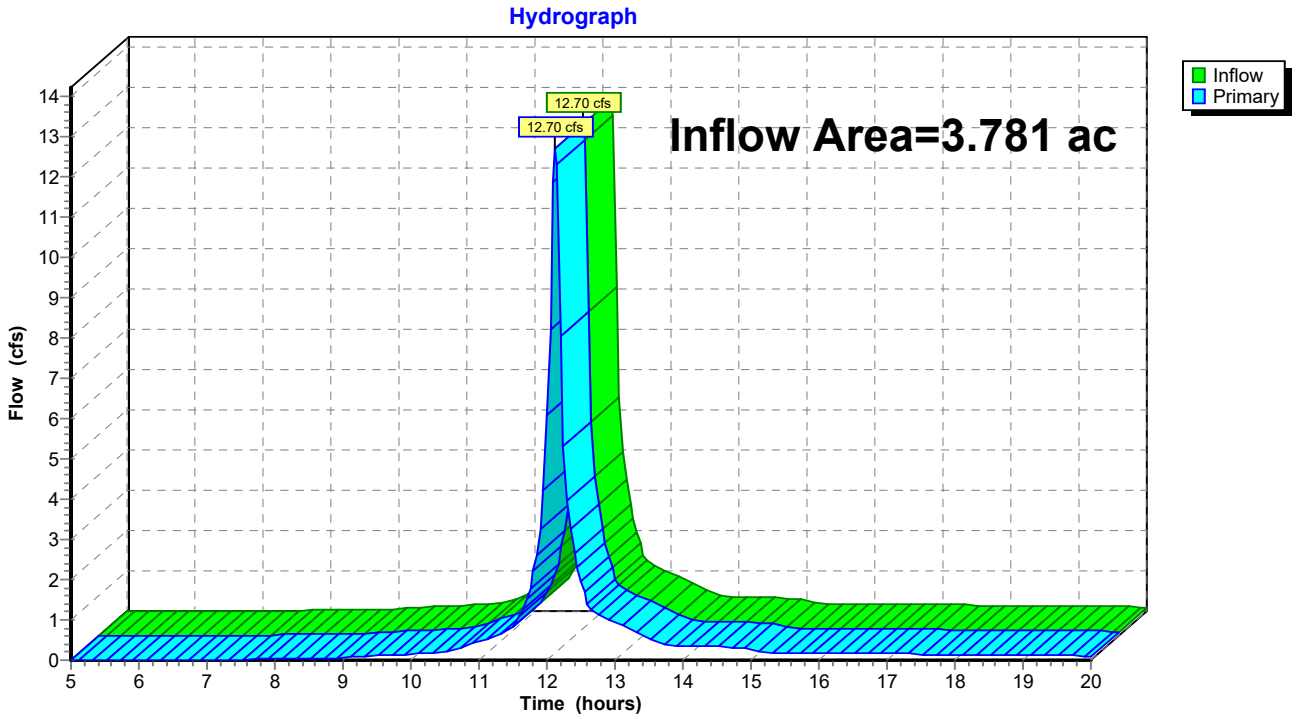
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.00	0.00
5.25	0.11	0.00	0.00
5.50	0.12	0.00	0.00
5.75	0.13	0.00	0.00
6.00	0.14	0.00	0.00
6.25	0.15	0.00	0.00
6.50	0.16	0.00	0.00
6.75	0.17	0.00	0.01
7.00	0.18	0.00	0.01
7.25	0.19	0.00	0.02
7.50	0.20	0.00	0.02
7.75	0.21	0.00	0.03
8.00	0.23	0.01	0.03
8.25	0.24	0.01	0.04
8.50	0.25	0.01	0.04
8.75	0.26	0.02	0.05
9.00	0.28	0.02	0.05
9.25	0.30	0.02	0.10
9.50	0.32	0.03	0.11
9.75	0.35	0.04	0.13
10.00	0.37	0.05	0.15
10.25	0.40	0.06	0.16
10.50	0.42	0.07	0.18
10.75	0.47	0.09	0.33
11.00	0.52	0.12	0.47
11.25	0.59	0.16	0.62
11.50	0.67	0.21	0.80
11.75	0.83	0.32	1.80
12.00	1.25	0.65	**6.08**
12.25	1.87	1.20	**5.31**
12.50	2.03	1.34	1.96
12.75	2.11	1.42	1.12
13.00	2.18	1.48	0.94
13.25	2.23	1.53	0.76
13.50	2.28	1.57	0.58
13.75	2.30	1.60	0.37
14.00	2.33	1.62	0.36
14.25	2.35	1.64	0.35
14.50	2.38	1.66	0.34
14.75	2.40	1.69	0.32
15.00	2.42	1.71	0.31
15.25	2.44	1.72	0.19
15.50	2.45	1.73	0.19
15.75	2.46	1.74	0.18
16.00	2.47	1.75	0.18
16.25	2.49	1.77	0.17
16.50	2.50	1.78	0.17
16.75	2.51	1.79	0.17
17.00	2.52	1.80	0.16
17.25	2.53	1.81	0.16
17.50	2.54	1.82	0.15
17.75	2.55	1.83	0.15
18.00	2.56	1.84	0.14
18.25	2.57	1.85	0.14
18.50	2.58	1.86	0.13
18.75	2.59	1.86	0.13
19.00	2.60	1.87	0.12
19.25	2.61	1.88	0.12
19.50	2.61	1.89	0.11
19.75	2.62	1.89	0.11
20.00	**2.63**	**1.90**	0.10

Summary for Link 2L: Existing Total

Inflow Area = 3.781 ac, 61.69% Impervious, Inflow Depth > 1.90" for 2 Year event
Inflow = 12.70 cfs @ 12.13 hrs, Volume= 0.599 af
Primary = 12.70 cfs @ 12.13 hrs, Volume= 0.599 af, Atten= 0%, Lag= 0.0 min

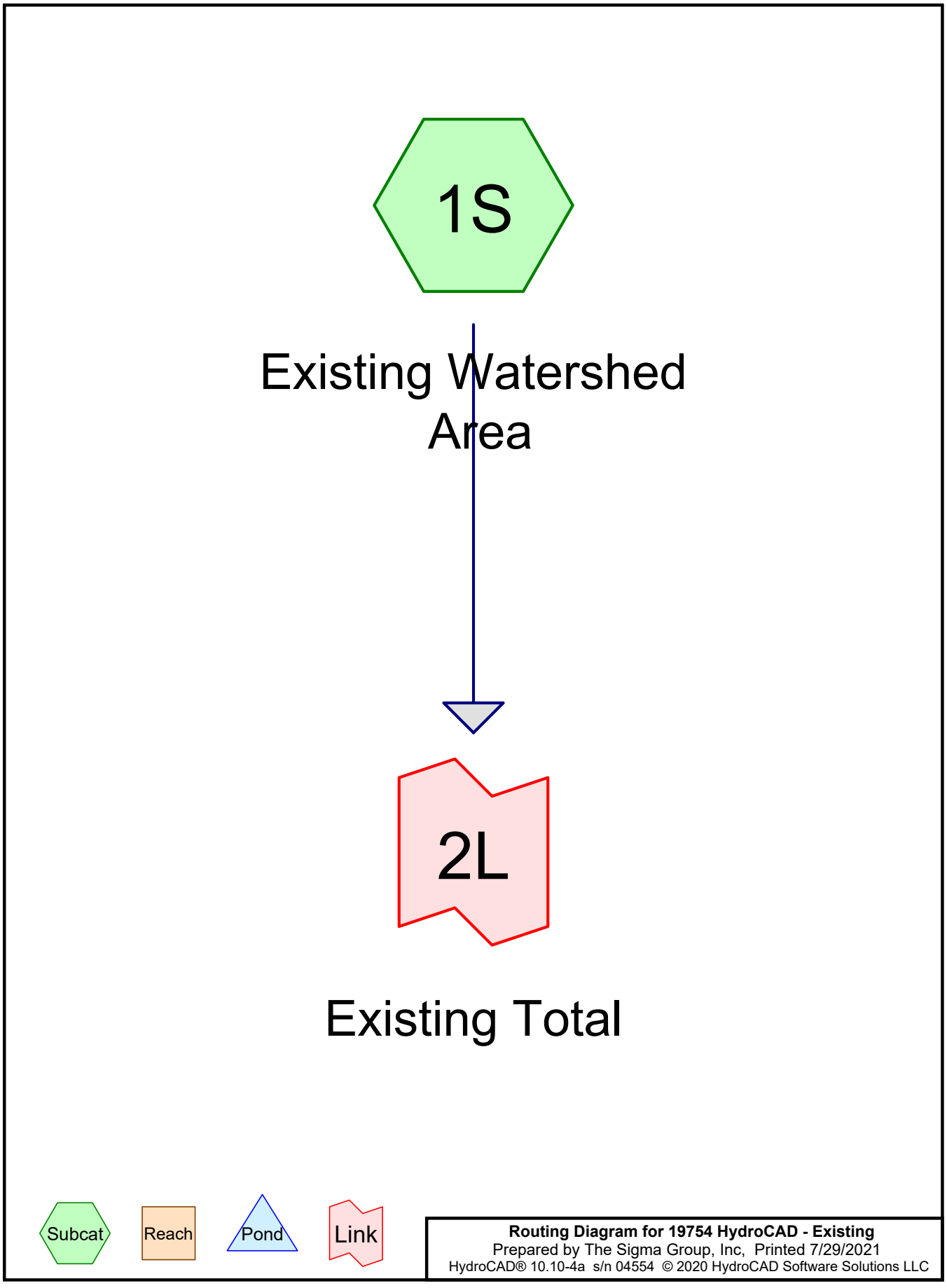
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Existing Total



Hydrograph for Link 2L: Existing Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	**0.00**	0.00
5.25	0.00	0.00	0.00
5.50	0.00	0.00	0.00
5.75	0.00	0.00	0.00
6.00	0.00	0.00	0.00
6.25	0.00	0.00	0.00
6.50	0.00	0.00	0.00
6.75	0.01	0.00	0.01
7.00	0.01	0.00	0.01
7.25	0.02	0.00	0.02
7.50	0.02	0.00	0.02
7.75	0.03	0.00	0.03
8.00	0.03	0.00	0.03
8.25	0.04	0.00	0.04
8.50	0.04	0.00	0.04
8.75	0.05	0.00	0.05
9.00	0.05	0.00	0.05
9.25	0.10	0.00	0.10
9.50	0.11	0.00	0.11
9.75	0.13	0.00	0.13
10.00	0.15	0.00	0.15
10.25	0.16	0.00	0.16
10.50	0.18	0.00	0.18
10.75	0.33	0.00	0.33
11.00	0.47	0.00	0.47
11.25	0.62	0.00	0.62
11.50	0.80	0.00	0.80
11.75	1.80	0.00	1.80
12.00	**6.08**	0.00	**6.08**
12.25	**5.31**	0.00	**5.31**
12.50	1.96	0.00	1.96
12.75	1.12	0.00	1.12
13.00	0.94	0.00	0.94
13.25	0.76	0.00	0.76
13.50	0.58	0.00	0.58
13.75	0.37	0.00	0.37
14.00	0.36	0.00	0.36
14.25	0.35	0.00	0.35
14.50	0.34	0.00	0.34
14.75	0.32	0.00	0.32
15.00	0.31	0.00	0.31
15.25	0.19	0.00	0.19
15.50	0.19	0.00	0.19
15.75	0.18	0.00	0.18
16.00	0.18	0.00	0.18
16.25	0.17	0.00	0.17
16.50	0.17	0.00	0.17
16.75	0.17	0.00	0.17
17.00	0.16	0.00	0.16
17.25	0.16	0.00	0.16
17.50	0.15	0.00	0.15
17.75	0.15	0.00	0.15
18.00	0.14	0.00	0.14
18.25	0.14	0.00	0.14
18.50	0.13	0.00	0.13
18.75	0.13	0.00	0.13
19.00	0.12	0.00	0.12
19.25	0.12	0.00	0.12
19.50	0.11	0.00	0.11
19.75	0.11	0.00	0.11
20.00	0.10	0.00	0.10



Routing Diagram for 19754 HydroCAD - Existing
Prepared by The Sigma Group, Inc, Printed 7/29/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10 Year	MSE 24-hr	3	Default	24.00	1	3.81	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.449	84	50-75% Grass cover, Fair, HSG D (1S)
2.332	98	Paved parking, HSG D (1S)
3.781	**93**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.781	HSG D	1S
0.000	Other	
3.781		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.449	0.000	1.449	50-75% Grass cover, Fair	1S
0.000	0.000	0.000	2.332	0.000	2.332	Paved parking	1S
0.000	**0.000**	**0.000**	**3.781**	**0.000**	**3.781**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Watershed Runoff Area=164,700 sf 61.69% Impervious Runoff Depth>2.94"
Tc=6.0 min CN=93 Runoff=19.06 cfs 0.925 af

Link 2L: Existing Total Inflow=19.06 cfs 0.925 af
Primary=19.06 cfs 0.925 af

Total Runoff Area = 3.781 ac Runoff Volume = 0.925 af Average Runoff Depth = 2.94"
38.31% Pervious = 1.449 ac 61.69% Impervious = 2.332 ac

Summary for Subcatchment 1S: Existing Watershed Area

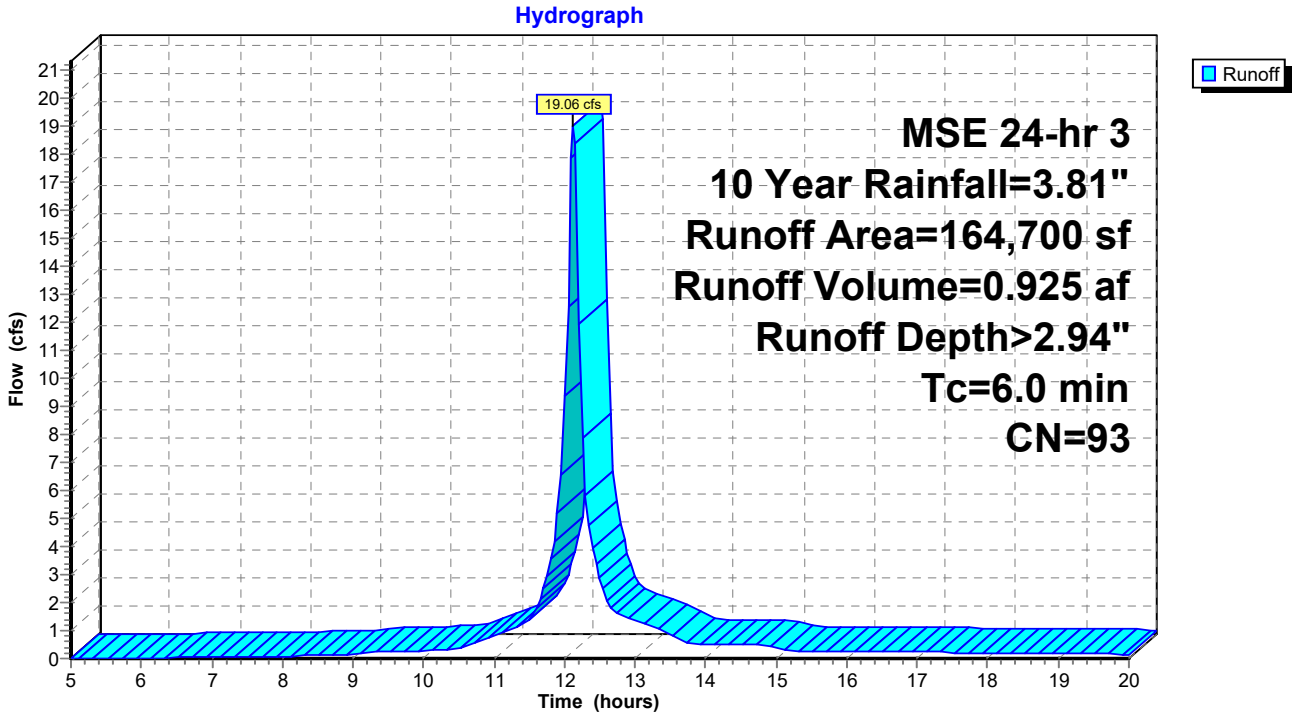
Runoff = 19.06 cfs @ 12.13 hrs, Volume= 0.925 af, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

Area (sf)	CN	Description
101,600	98	Paved parking, HSG D
63,100	84	50-75% Grass cover, Fair, HSG D
164,700	93	Weighted Average
63,100		38.31% Pervious Area
101,600		61.69% Impervious Area

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

Subcatchment 1S: Existing Watershed Area



Hydrograph for Subcatchment 1S: Existing Watershed Area

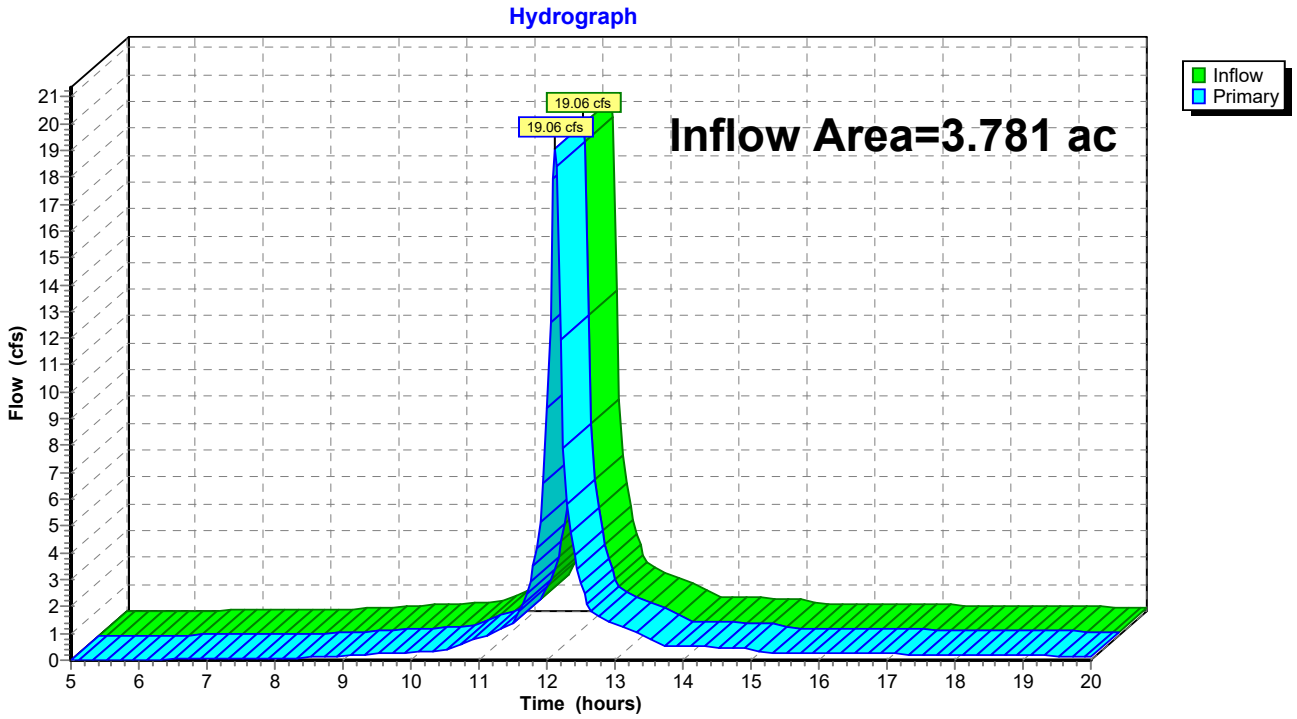
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.14	0.00	0.00
5.25	0.16	0.00	0.00
5.50	0.17	0.00	0.01
5.75	0.18	0.00	0.01
6.00	0.19	0.00	0.02
6.25	0.21	0.00	0.03
6.50	0.22	0.01	0.03
6.75	0.24	0.01	0.04
7.00	0.25	0.01	0.05
7.25	0.27	0.02	0.06
7.50	0.28	0.02	0.07
7.75	0.30	0.03	0.08
8.00	0.32	0.03	0.09
8.25	0.34	0.04	0.09
8.50	0.35	0.04	0.10
8.75	0.37	0.05	0.11
9.00	0.39	0.06	0.12
9.25	0.42	0.07	0.21
9.50	0.46	0.09	0.24
9.75	0.49	0.11	0.26
10.00	0.52	0.12	0.29
10.25	0.56	0.14	0.31
10.50	0.60	0.17	0.33
10.75	0.66	0.20	0.60
11.00	0.73	0.25	0.82
11.25	0.83	0.32	1.06
11.50	0.94	0.41	1.34
11.75	1.17	0.59	2.92
12.00	1.76	1.10	**9.41**
12.25	2.64	1.91	**7.87**
12.50	2.87	2.13	2.87
12.75	2.98	2.23	1.64
13.00	3.08	2.33	1.37
13.25	3.15	2.40	1.11
13.50	3.21	2.46	0.84
13.75	3.25	2.49	0.54
14.00	3.29	2.53	0.52
14.25	3.32	2.56	0.50
14.50	3.35	2.59	0.49
14.75	3.39	2.63	0.47
15.00	3.42	2.66	0.46
15.25	3.44	2.67	0.28
15.50	3.46	2.69	0.27
15.75	3.47	2.71	0.27
16.00	3.49	2.73	0.26
16.25	3.51	2.74	0.25
16.50	3.53	2.76	0.25
16.75	3.54	2.77	0.24
17.00	3.56	2.79	0.23
17.25	3.57	2.81	0.23
17.50	3.59	2.82	0.22
17.75	3.60	2.83	0.21
18.00	3.62	2.85	0.21
18.25	3.63	2.86	0.20
18.50	3.64	2.87	0.19
18.75	3.65	2.88	0.18
19.00	3.67	2.90	0.18
19.25	3.68	2.91	0.17
19.50	3.69	2.92	0.16
19.75	3.70	2.93	0.16
20.00	**3.71**	**2.94**	0.15

Summary for Link 2L: Existing Total

Inflow Area = 3.781 ac, 61.69% Impervious, Inflow Depth > 2.94" for 10 Year event
Inflow = 19.06 cfs @ 12.13 hrs, Volume= 0.925 af
Primary = 19.06 cfs @ 12.13 hrs, Volume= 0.925 af, Atten= 0%, Lag= 0.0 min

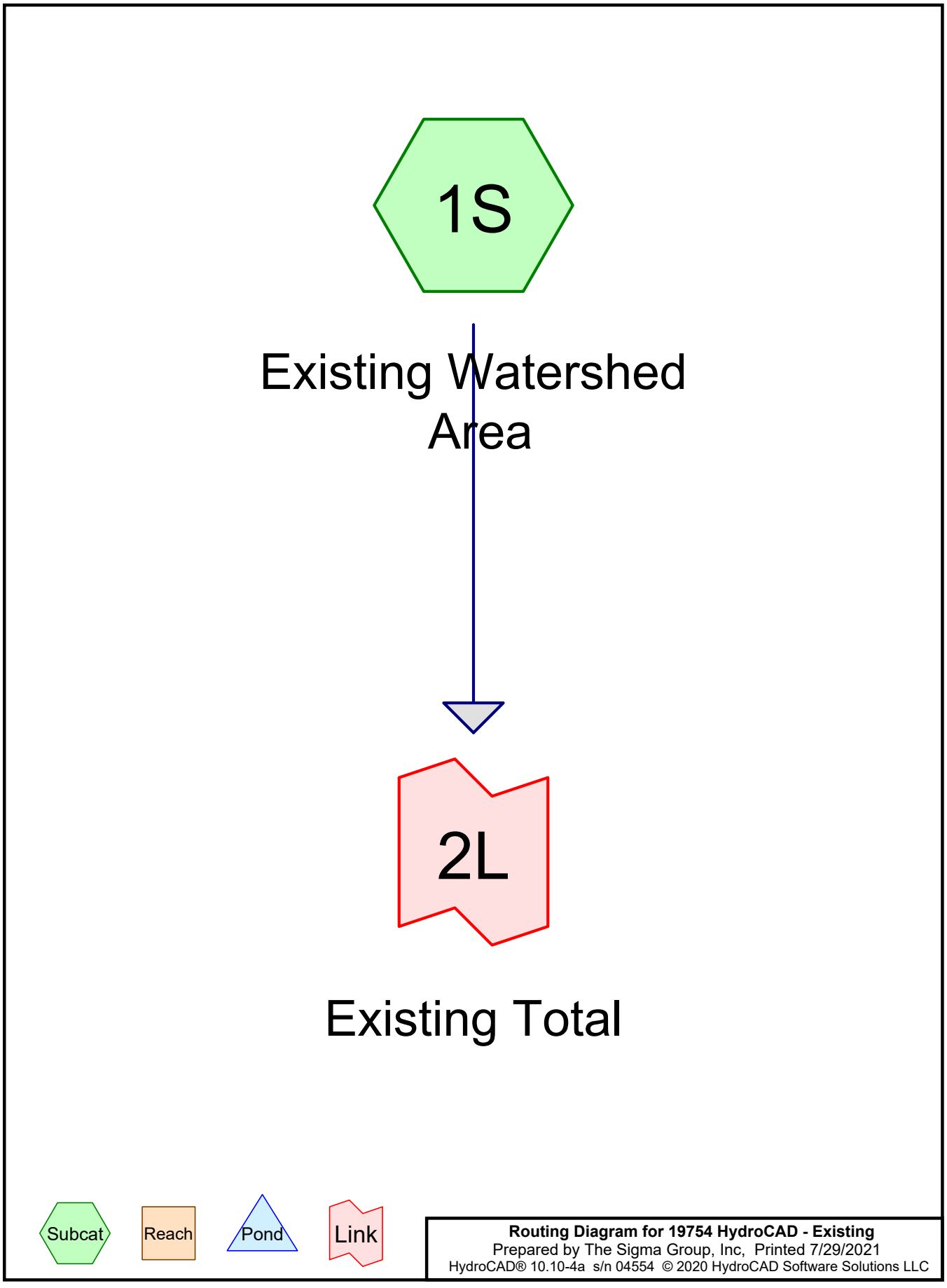
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Existing Total



Hydrograph for Link 2L: Existing Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	**0.00**	0.00
5.25	0.00	0.00	0.00
5.50	0.01	0.00	0.01
5.75	0.01	0.00	0.01
6.00	0.02	0.00	0.02
6.25	0.03	0.00	0.03
6.50	0.03	0.00	0.03
6.75	0.04	0.00	0.04
7.00	0.05	0.00	0.05
7.25	0.06	0.00	0.06
7.50	0.07	0.00	0.07
7.75	0.08	0.00	0.08
8.00	0.09	0.00	0.09
8.25	0.09	0.00	0.09
8.50	0.10	0.00	0.10
8.75	0.11	0.00	0.11
9.00	0.12	0.00	0.12
9.25	0.21	0.00	0.21
9.50	0.24	0.00	0.24
9.75	0.26	0.00	0.26
10.00	0.29	0.00	0.29
10.25	0.31	0.00	0.31
10.50	0.33	0.00	0.33
10.75	0.60	0.00	0.60
11.00	0.82	0.00	0.82
11.25	1.06	0.00	1.06
11.50	1.34	0.00	1.34
11.75	2.92	0.00	2.92
12.00	**9.41**	0.00	**9.41**
12.25	**7.87**	0.00	**7.87**
12.50	2.87	0.00	2.87
12.75	1.64	0.00	1.64
13.00	1.37	0.00	1.37
13.25	1.11	0.00	1.11
13.50	0.84	0.00	0.84
13.75	0.54	0.00	0.54
14.00	0.52	0.00	0.52
14.25	0.50	0.00	0.50
14.50	0.49	0.00	0.49
14.75	0.47	0.00	0.47
15.00	0.46	0.00	0.46
15.25	0.28	0.00	0.28
15.50	0.27	0.00	0.27
15.75	0.27	0.00	0.27
16.00	0.26	0.00	0.26
16.25	0.25	0.00	0.25
16.50	0.25	0.00	0.25
16.75	0.24	0.00	0.24
17.00	0.23	0.00	0.23
17.25	0.23	0.00	0.23
17.50	0.22	0.00	0.22
17.75	0.21	0.00	0.21
18.00	0.21	0.00	0.21
18.25	0.20	0.00	0.20
18.50	0.19	0.00	0.19
18.75	0.18	0.00	0.18
19.00	0.18	0.00	0.18
19.25	0.17	0.00	0.17
19.50	0.16	0.00	0.16
19.75	0.16	0.00	0.16
20.00	0.15	0.00	0.15



Routing Diagram for 19754 HydroCAD - Existing
Prepared by The Sigma Group, Inc, Printed 7/29/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	100 Year	MSE 24-hr	3	Default	24.00	1	6.18	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.449	84	50-75% Grass cover, Fair, HSG D (1S)
2.332	98	Paved parking, HSG D (1S)
3.781	**93**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.781	HSG D	1S
0.000	Other	
3.781		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.449	0.000	1.449	50-75% Grass cover, Fair	1S
0.000	0.000	0.000	2.332	0.000	2.332	Paved parking	1S
0.000	**0.000**	**0.000**	**3.781**	**0.000**	**3.781**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Watershed Runoff Area=164,700 sf 61.69% Impervious Runoff Depth>5.19"
Tc=6.0 min CN=93 Runoff=32.43 cfs 1.635 af

Link 2L: Existing Total Inflow=32.43 cfs 1.635 af
Primary=32.43 cfs 1.635 af

Total Runoff Area = 3.781 ac Runoff Volume = 1.635 af Average Runoff Depth = 5.19"
38.31% Pervious = 1.449 ac 61.69% Impervious = 2.332 ac

Summary for Subcatchment 1S: Existing Watershed Area

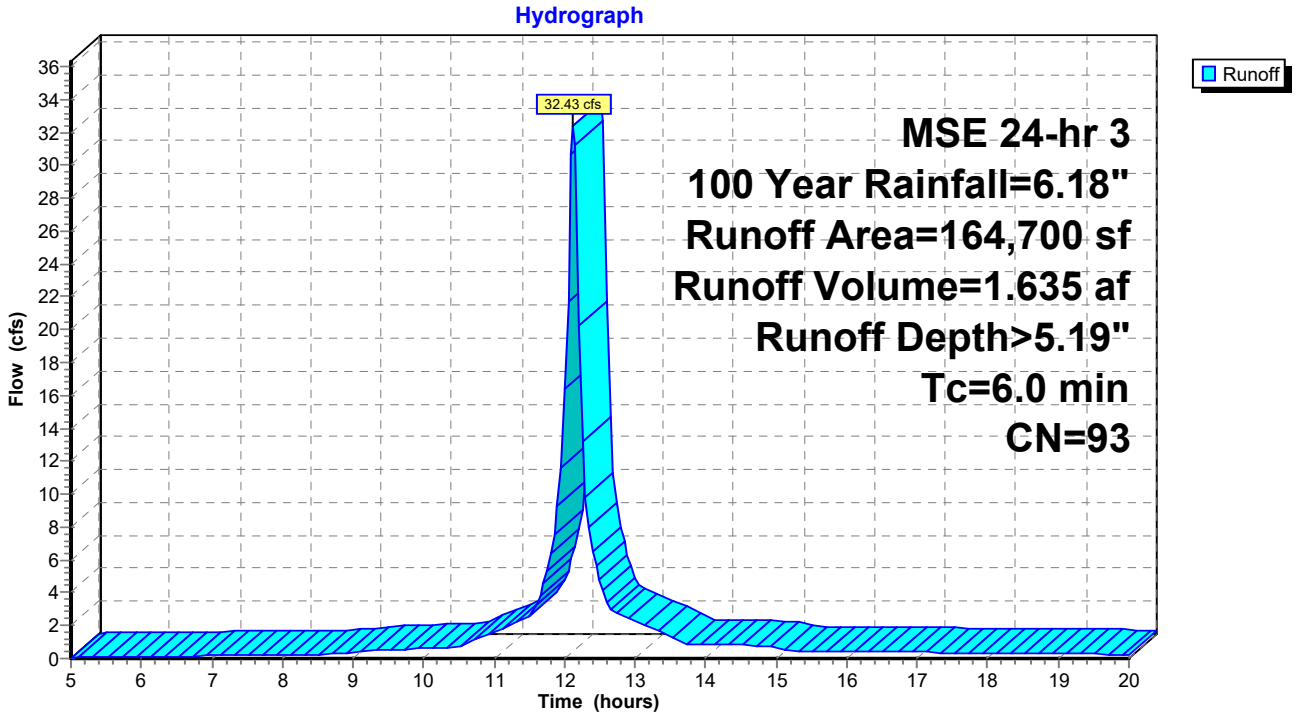
Runoff = 32.43 cfs @ 12.13 hrs, Volume= 1.635 af, Depth> 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

Area (sf)	CN	Description
101,600	98	Paved parking, HSG D
63,100	84	50-75% Grass cover, Fair, HSG D
164,700	93	Weighted Average
63,100		38.31% Pervious Area
101,600		61.69% Impervious Area

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

Subcatchment 1S: Existing Watershed Area



Hydrograph for Subcatchment 1S: Existing Watershed Area

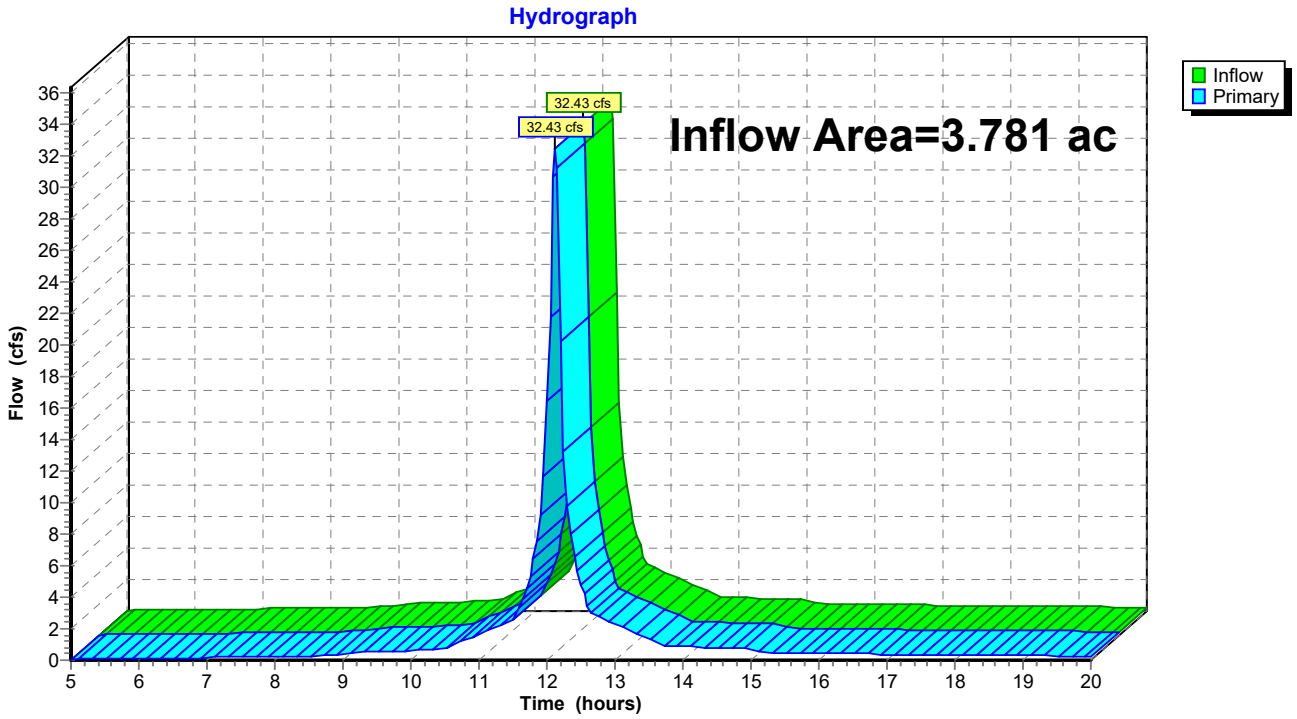
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.23	0.01	0.05
5.25	0.25	0.01	0.06
5.50	0.27	0.02	0.08
5.75	0.29	0.02	0.09
6.00	0.31	0.03	0.11
6.25	0.34	0.04	0.12
6.50	0.36	0.05	0.14
6.75	0.39	0.06	0.15
7.00	0.41	0.07	0.17
7.25	0.44	0.08	0.18
7.50	0.46	0.09	0.20
7.75	0.49	0.11	0.21
8.00	0.52	0.12	0.23
8.25	0.55	0.14	0.25
8.50	0.58	0.15	0.26
8.75	0.61	0.17	0.28
9.00	0.64	0.19	0.30
9.25	0.69	0.22	0.50
9.50	0.74	0.26	0.54
9.75	0.79	0.30	0.58
10.00	0.85	0.34	0.62
10.25	0.91	0.38	0.66
10.50	0.97	0.42	0.69
10.75	1.06	0.50	1.21
11.00	1.19	0.60	1.63
11.25	1.35	0.74	2.05
11.50	1.53	0.89	2.51
11.75	1.90	1.22	5.32
12.00	2.86	2.12	**16.45**
12.25	4.28	3.49	**13.24**
12.50	4.65	3.85	4.80
12.75	4.83	4.03	2.73
13.00	4.99	4.19	2.28
13.25	5.12	4.31	1.85
13.50	5.21	4.41	1.40
13.75	5.27	4.47	0.89
14.00	5.33	4.52	0.86
14.25	5.39	4.58	0.83
14.50	5.44	4.63	0.81
14.75	5.49	4.68	0.78
15.00	5.54	4.73	0.75
15.25	5.57	4.76	0.47
15.50	5.60	4.79	0.45
15.75	5.63	4.82	0.44
16.00	5.66	4.85	0.43
16.25	5.69	4.88	0.42
16.50	5.72	4.90	0.41
16.75	5.74	4.93	0.40
17.00	5.77	4.96	0.38
17.25	5.79	4.98	0.37
17.50	5.82	5.00	0.36
17.75	5.84	5.03	0.35
18.00	5.87	5.05	0.34
18.25	5.89	5.07	0.33
18.50	5.91	5.09	0.32
18.75	5.93	5.11	0.30
19.00	5.95	5.13	0.29
19.25	5.97	5.15	0.28
19.50	5.98	5.17	0.27
19.75	6.00	5.18	0.26
20.00	**6.02**	**5.20**	0.25

Summary for Link 2L: Existing Total

Inflow Area = 3.781 ac, 61.69% Impervious, Inflow Depth > 5.19" for 100 Year event
Inflow = 32.43 cfs @ 12.13 hrs, Volume= 1.635 af
Primary = 32.43 cfs @ 12.13 hrs, Volume= 1.635 af, Atten= 0%, Lag= 0.0 min

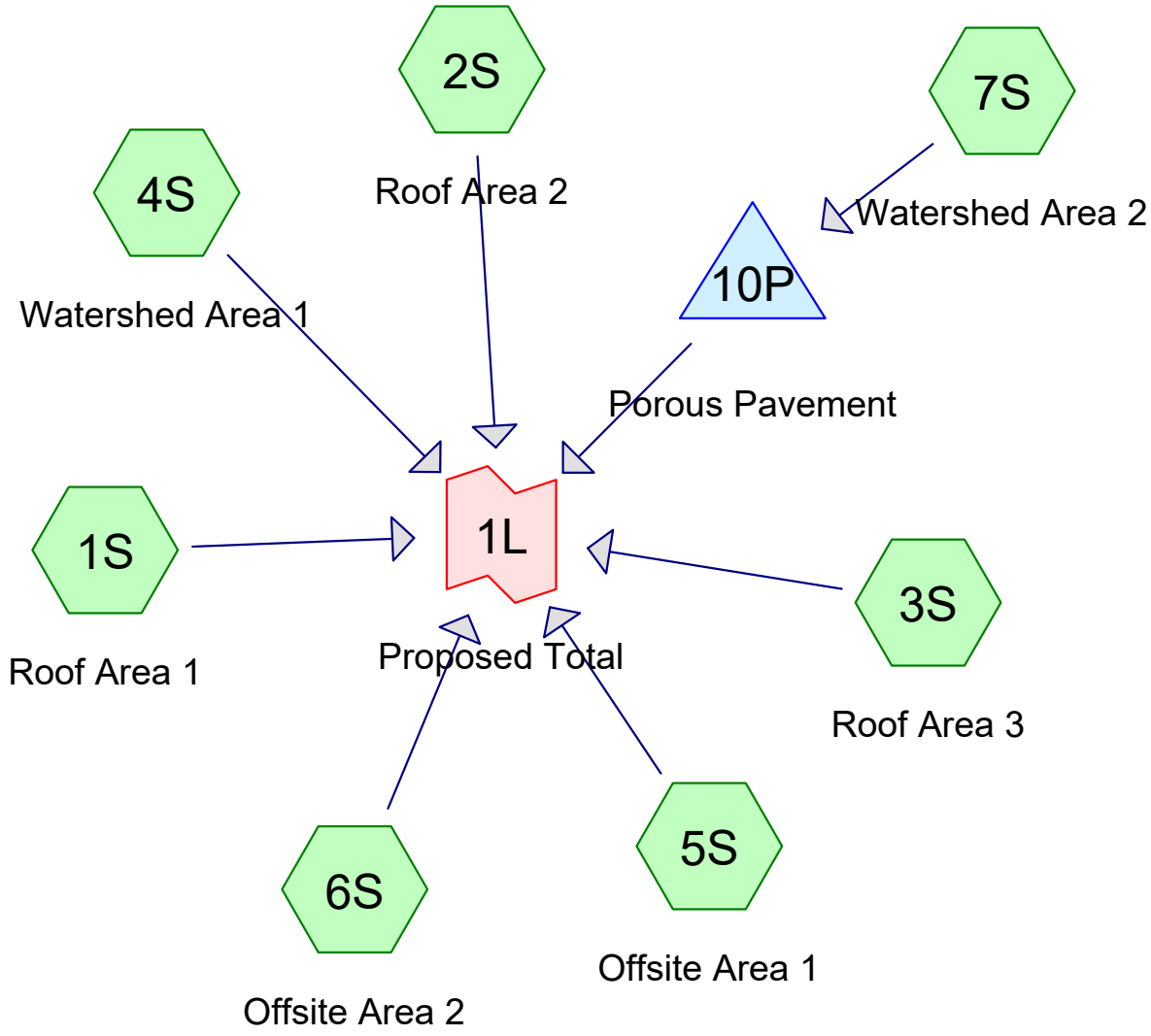
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Existing Total



Hydrograph for Link 2L: Existing Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.05	**0.00**	0.05	18.00	0.34	0.00	0.34
5.25	0.06	0.00	0.06	18.25	0.33	0.00	0.33
5.50	0.08	0.00	0.08	18.50	0.32	0.00	0.32
5.75	0.09	0.00	0.09	18.75	0.30	0.00	0.30
6.00	0.11	0.00	0.11	19.00	0.29	0.00	0.29
6.25	0.12	0.00	0.12	19.25	0.28	0.00	0.28
6.50	0.14	0.00	0.14	19.50	0.27	0.00	0.27
6.75	0.15	0.00	0.15	19.75	0.26	0.00	0.26
7.00	0.17	0.00	0.17	20.00	0.25	0.00	0.25
7.25	0.18	0.00	0.18				
7.50	0.20	0.00	0.20				
7.75	0.21	0.00	0.21				
8.00	0.23	0.00	0.23				
8.25	0.25	0.00	0.25				
8.50	0.26	0.00	0.26				
8.75	0.28	0.00	0.28				
9.00	0.30	0.00	0.30				
9.25	0.50	0.00	0.50				
9.50	0.54	0.00	0.54				
9.75	0.58	0.00	0.58				
10.00	0.62	0.00	0.62				
10.25	0.66	0.00	0.66				
10.50	0.69	0.00	0.69				
10.75	1.21	0.00	1.21				
11.00	1.63	0.00	1.63				
11.25	2.05	0.00	2.05				
11.50	2.51	0.00	2.51				
11.75	5.32	0.00	5.32				
12.00	**16.45**	0.00	**16.45**				
12.25	**13.24**	0.00	**13.24**				
12.50	4.80	0.00	4.80				
12.75	2.73	0.00	2.73				
13.00	2.28	0.00	2.28				
13.25	1.85	0.00	1.85				
13.50	1.40	0.00	1.40				
13.75	0.89	0.00	0.89				
14.00	0.86	0.00	0.86				
14.25	0.83	0.00	0.83				
14.50	0.81	0.00	0.81				
14.75	0.78	0.00	0.78				
15.00	0.75	0.00	0.75				
15.25	0.47	0.00	0.47				
15.50	0.45	0.00	0.45				
15.75	0.44	0.00	0.44				
16.00	0.43	0.00	0.43				
16.25	0.42	0.00	0.42				
16.50	0.41	0.00	0.41				
16.75	0.40	0.00	0.40				
17.00	0.38	0.00	0.38				
17.25	0.37	0.00	0.37				
17.50	0.36	0.00	0.36				
17.75	0.35	0.00	0.35				



Subcat Reach Pond Link

Routing Diagram for 19754 HydroCAD - Proposed
Prepared by The Sigma Group, Inc, Printed 7/29/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 Year	MSE 24-hr	3	Default	24.00	1	2.40	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.830	80	>75% Grass cover, Good, HSG D (5S, 6S, 7S)
1.015	98	Paved parking, HSG D (4S, 5S, 6S, 7S)
1.935	98	Roofs, HSG D (1S, 2S, 3S)
3.781	**94**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.781	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	Other	
3.781		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.830	0.000	0.830	>75% Grass cover, Good	5S, 6S, 7S
0.000	0.000	0.000	1.015	0.000	1.015	Paved parking	4S, 5S, 6S, 7S
0.000	0.000	0.000	1.935	0.000	1.935	Roofs	1S, 2S, 3S
0.000	**0.000**	**0.000**	**3.781**	**0.000**	**3.781**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Roof Area 1 Runoff Area=25,800 sf 100.00% Impervious Runoff Depth>2.10"
Tc=6.0 min CN=98 Runoff=2.01 cfs 0.104 af

Subcatchment2S: Roof Area 2 Runoff Area=26,590 sf 100.00% Impervious Runoff Depth>2.10"
Tc=6.0 min CN=98 Runoff=2.07 cfs 0.107 af

Subcatchment3S: Roof Area 3 Runoff Area=31,915 sf 100.00% Impervious Runoff Depth>2.10"
Tc=6.0 min CN=98 Runoff=2.48 cfs 0.128 af

Subcatchment4S: Watershed Area 1 Runoff Area=4,950 sf 100.00% Impervious Runoff Depth>2.10"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.020 af

Subcatchment5S: Offsite Area 1 Runoff Area=19,340 sf 47.36% Impervious Runoff Depth>1.31"
Tc=6.0 min CN=89 Runoff=1.08 cfs 0.049 af

Subcatchment6S: Offsite Area 2 Runoff Area=31,205 sf 34.24% Impervious Runoff Depth>1.11"
Tc=6.0 min CN=86 Runoff=1.49 cfs 0.066 af

Subcatchment7S: Watershed Area 2 Runoff Area=24,900 sf 78.07% Impervious Runoff Depth>1.71"
Tc=6.0 min CN=94 Runoff=1.72 cfs 0.082 af

Pond 10P: Porous Pavement Peak Elev=29.05' Storage=1,281 cf Inflow=1.72 cfs 0.082 af
Outflow=0.64 cfs 0.079 af

Link 1L: Proposed Total Inflow=10.04 cfs 0.552 af
Primary=10.04 cfs 0.552 af

Total Runoff Area = 3.781 ac Runoff Volume = 0.555 af Average Runoff Depth = 1.76"
21.96% Pervious = 0.830 ac 78.04% Impervious = 2.951 ac

Summary for Subcatchment 1S: Roof Area 1

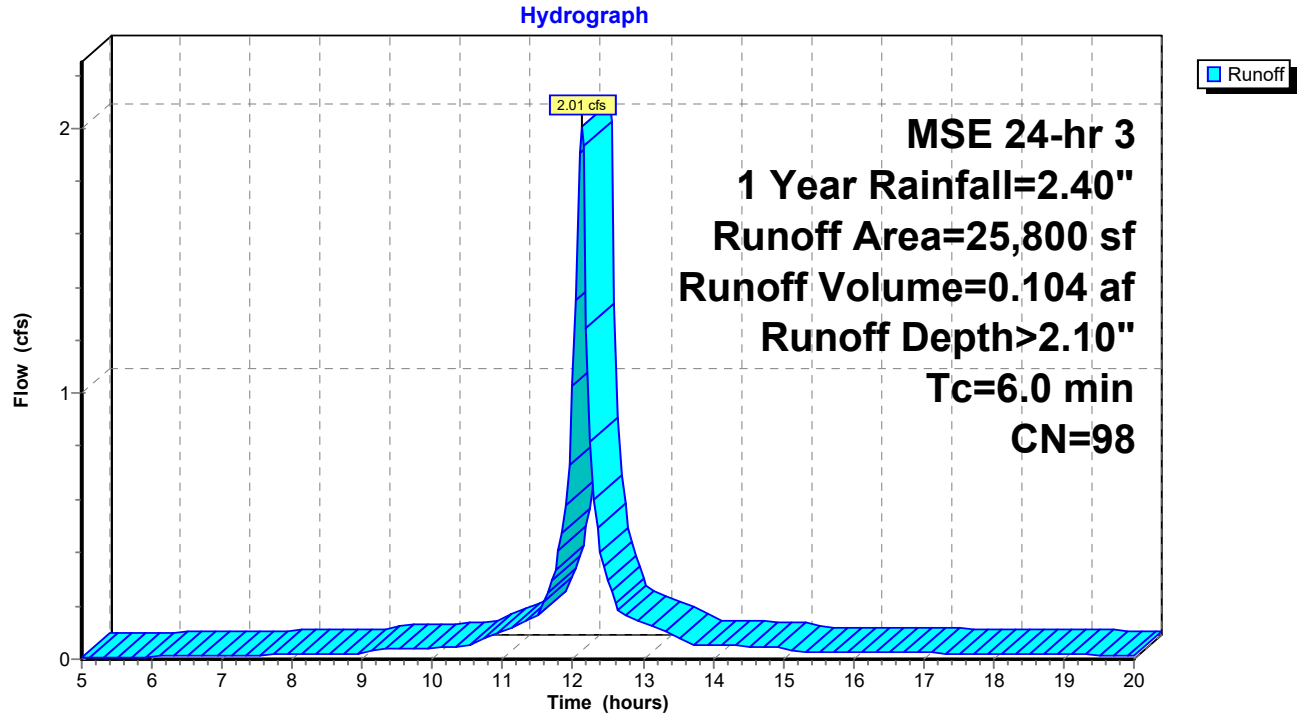
Runoff = 2.01 cfs @ 12.13 hrs, Volume= 0.104 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

Area (sf)	CN	Description
25,800	98	Roofs, HSG D
25,800		100.00% Impervious Area

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

Subcatchment 1S: Roof Area 1



Hydrograph for Subcatchment 1S: Roof Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.01	0.01
5.25	0.10	0.01	0.01
5.50	0.11	0.02	0.01
5.75	0.11	0.02	0.01
6.00	0.12	0.02	0.01
6.25	0.13	0.03	0.01
6.50	0.14	0.03	0.01
6.75	0.15	0.04	0.01
7.00	0.16	0.04	0.01
7.25	0.17	0.05	0.01
7.50	0.18	0.06	0.02
7.75	0.19	0.06	0.02
8.00	0.20	0.07	0.02
8.25	0.21	0.08	0.02
8.50	0.22	0.09	0.02
8.75	0.24	0.09	0.02
9.00	0.25	0.10	0.02
9.25	0.27	0.12	0.04
9.50	0.29	0.13	0.04
9.75	0.31	0.15	0.04
10.00	0.33	0.17	0.04
10.25	0.35	0.19	0.04
10.50	0.38	0.21	0.05
10.75	0.41	0.24	0.08
11.00	0.46	0.28	0.11
11.25	0.52	0.34	0.13
11.50	0.60	0.41	0.16
11.75	0.74	0.54	0.34
12.00	1.11	0.90	**1.03**
12.25	1.66	1.44	**0.82**
12.50	1.80	1.58	0.29
12.75	1.88	1.65	0.17
13.00	1.94	1.71	0.14
13.25	1.99	1.76	0.11
13.50	2.02	1.80	0.09
13.75	2.05	1.82	0.05
14.00	2.07	1.84	0.05
14.25	2.09	1.87	0.05
14.50	2.11	1.89	0.05
14.75	2.13	1.91	0.05
15.00	2.15	1.93	0.05
15.25	2.16	1.94	0.03
15.50	2.18	1.95	0.03
15.75	2.19	1.96	0.03
16.00	2.20	1.97	0.03
16.25	2.21	1.98	0.03
16.50	2.22	1.99	0.03
16.75	2.23	2.00	0.02
17.00	2.24	2.01	0.02
17.25	2.25	2.02	0.02
17.50	2.26	2.03	0.02
17.75	2.27	2.04	0.02
18.00	2.28	2.05	0.02
18.25	2.29	2.06	0.02
18.50	2.29	2.07	0.02
18.75	2.30	2.07	0.02
19.00	2.31	2.08	0.02
19.25	2.32	2.09	0.02
19.50	2.32	2.10	0.02
19.75	2.33	2.10	0.02
20.00	**2.34**	**2.11**	0.02

Summary for Subcatchment 2S: Roof Area 2

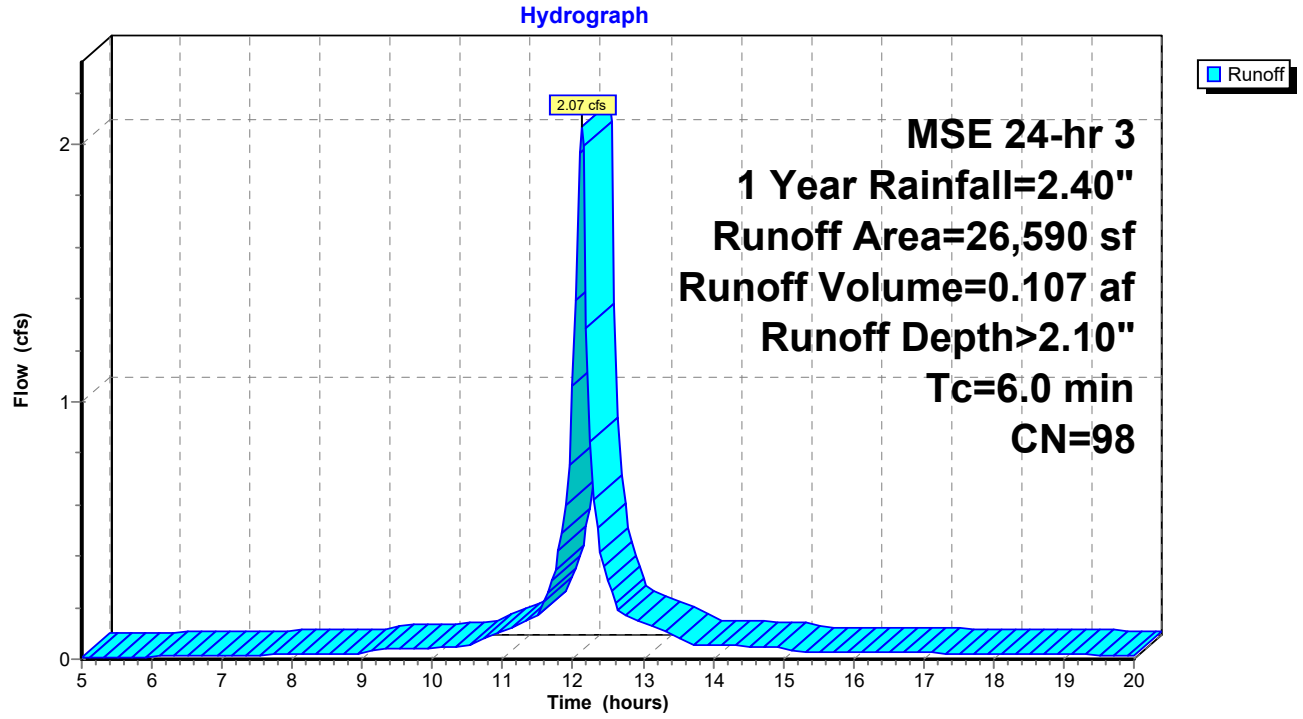
Runoff = 2.07 cfs @ 12.13 hrs, Volume= 0.107 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

Area (sf)	CN	Description
26,590	98	Roofs, HSG D
26,590		100.00% Impervious Area

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

Subcatchment 2S: Roof Area 2



Hydrograph for Subcatchment 2S: Roof Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.01	0.01
5.25	0.10	0.01	0.01
5.50	0.11	0.02	0.01
5.75	0.11	0.02	0.01
6.00	0.12	0.02	0.01
6.25	0.13	0.03	0.01
6.50	0.14	0.03	0.01
6.75	0.15	0.04	0.01
7.00	0.16	0.04	0.01
7.25	0.17	0.05	0.02
7.50	0.18	0.06	0.02
7.75	0.19	0.06	0.02
8.00	0.20	0.07	0.02
8.25	0.21	0.08	0.02
8.50	0.22	0.09	0.02
8.75	0.24	0.09	0.02
9.00	0.25	0.10	0.02
9.25	0.27	0.12	0.04
9.50	0.29	0.13	0.04
9.75	0.31	0.15	0.04
10.00	0.33	0.17	0.04
10.25	0.35	0.19	0.05
10.50	0.38	0.21	0.05
10.75	0.41	0.24	0.08
11.00	0.46	0.28	0.11
11.25	0.52	0.34	0.14
11.50	0.60	0.41	0.17
11.75	0.74	0.54	0.35
12.00	1.11	0.90	**1.06**
12.25	1.66	1.44	**0.84**
12.50	1.80	1.58	0.30
12.75	1.88	1.65	0.17
13.00	1.94	1.71	0.14
13.25	1.99	1.76	0.12
13.50	2.02	1.80	0.09
13.75	2.05	1.82	0.06
14.00	2.07	1.84	0.05
14.25	2.09	1.87	0.05
14.50	2.11	1.89	0.05
14.75	2.13	1.91	0.05
15.00	2.15	1.93	0.05
15.25	2.16	1.94	0.03
15.50	2.18	1.95	0.03
15.75	2.19	1.96	0.03
16.00	2.20	1.97	0.03
16.25	2.21	1.98	0.03
16.50	2.22	1.99	0.03
16.75	2.23	2.00	0.03
17.00	2.24	2.01	0.02
17.25	2.25	2.02	0.02
17.50	2.26	2.03	0.02
17.75	2.27	2.04	0.02
18.00	2.28	2.05	0.02
18.25	2.29	2.06	0.02
18.50	2.29	2.07	0.02
18.75	2.30	2.07	0.02
19.00	2.31	2.08	0.02
19.25	2.32	2.09	0.02
19.50	2.32	2.10	0.02
19.75	2.33	2.10	0.02
20.00	**2.34**	**2.11**	0.02

Summary for Subcatchment 3S: Roof Area 3

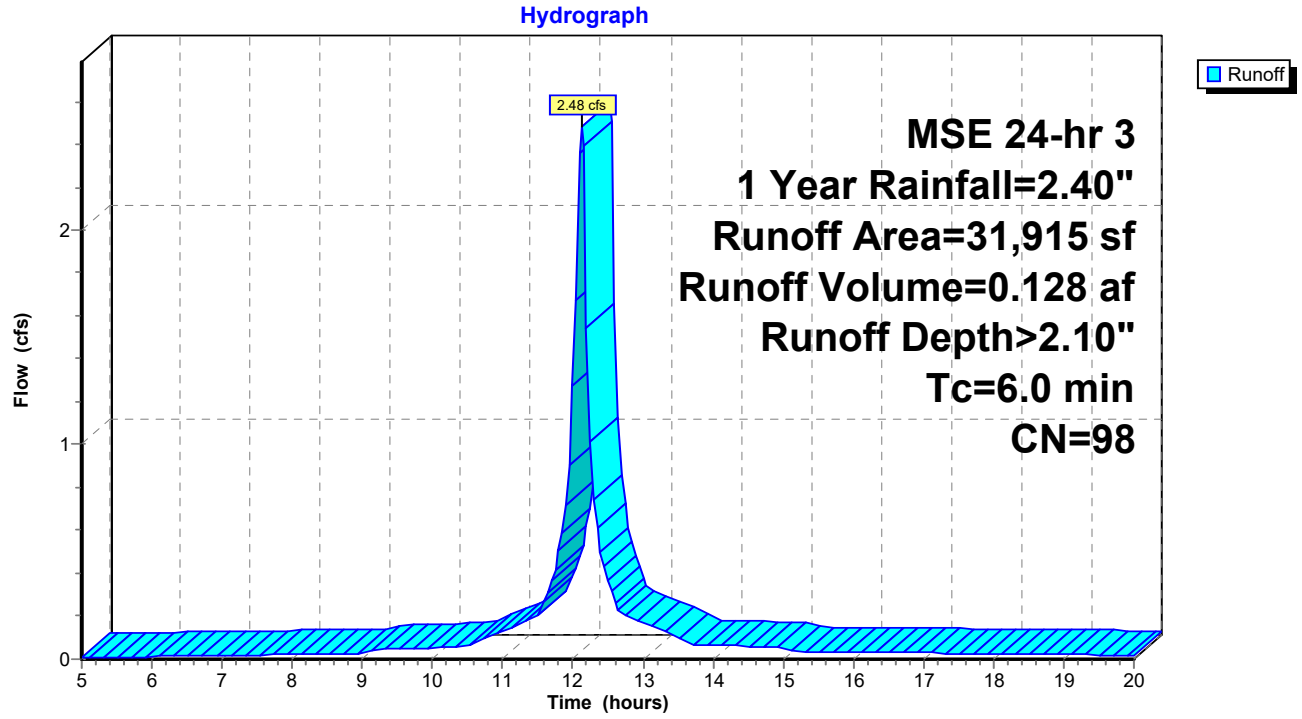
Runoff = 2.48 cfs @ 12.13 hrs, Volume= 0.128 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

Area (sf)	CN	Description
31,915	98	Roofs, HSG D
31,915		100.00% Impervious Area

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

Subcatchment 3S: Roof Area 3



Hydrograph for Subcatchment 3S: Roof Area 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.01	0.01
5.25	0.10	0.01	0.01
5.50	0.11	0.02	0.01
5.75	0.11	0.02	0.01
6.00	0.12	0.02	0.01
6.25	0.13	0.03	0.01
6.50	0.14	0.03	0.01
6.75	0.15	0.04	0.02
7.00	0.16	0.04	0.02
7.25	0.17	0.05	0.02
7.50	0.18	0.06	0.02
7.75	0.19	0.06	0.02
8.00	0.20	0.07	0.02
8.25	0.21	0.08	0.02
8.50	0.22	0.09	0.02
8.75	0.24	0.09	0.03
9.00	0.25	0.10	0.03
9.25	0.27	0.12	0.04
9.50	0.29	0.13	0.05
9.75	0.31	0.15	0.05
10.00	0.33	0.17	0.05
10.25	0.35	0.19	0.06
10.50	0.38	0.21	0.06
10.75	0.41	0.24	0.10
11.00	0.46	0.28	0.13
11.25	0.52	0.34	0.17
11.50	0.60	0.41	0.20
11.75	0.74	0.54	0.42
12.00	1.11	0.90	**1.27**
12.25	1.66	1.44	**1.01**
12.50	1.80	1.58	0.36
12.75	1.88	1.65	0.21
13.00	1.94	1.71	0.17
13.25	1.99	1.76	0.14
13.50	2.02	1.80	0.11
13.75	2.05	1.82	0.07
14.00	2.07	1.84	0.07
14.25	2.09	1.87	0.06
14.50	2.11	1.89	0.06
14.75	2.13	1.91	0.06
15.00	2.15	1.93	0.06
15.25	2.16	1.94	0.04
15.50	2.18	1.95	0.03
15.75	2.19	1.96	0.03
16.00	2.20	1.97	0.03
16.25	2.21	1.98	0.03
16.50	2.22	1.99	0.03
16.75	2.23	2.00	0.03
17.00	2.24	2.01	0.03
17.25	2.25	2.02	0.03
17.50	2.26	2.03	0.03
17.75	2.27	2.04	0.03
18.00	2.28	2.05	0.03
18.25	2.29	2.06	0.02
18.50	2.29	2.07	0.02
18.75	2.30	2.07	0.02
19.00	2.31	2.08	0.02
19.25	2.32	2.09	0.02
19.50	2.32	2.10	0.02
19.75	2.33	2.10	0.02
20.00	**2.34**	**2.11**	0.02

Summary for Subcatchment 4S: Watershed Area 1

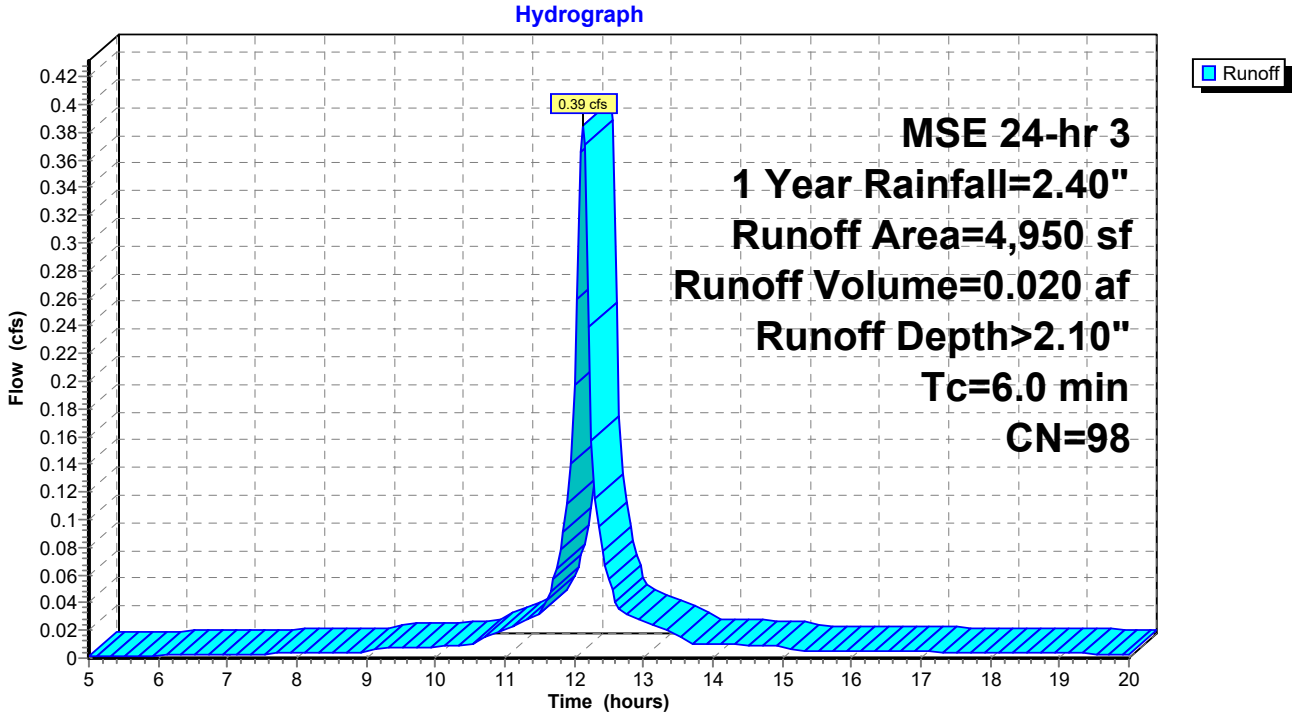
Runoff = 0.39 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

Area (sf)	CN	Description
4,950	98	Paved parking, HSG D
0	80	>75% Grass cover, Good, HSG D
4,950	98	Weighted Average
4,950		100.00% Impervious Area

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

Subcatchment 4S: Watershed Area 1



Hydrograph for Subcatchment 4S: Watershed Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.01	0.00
5.25	0.10	0.01	0.00
5.50	0.11	0.02	0.00
5.75	0.11	0.02	0.00
6.00	0.12	0.02	0.00
6.25	0.13	0.03	0.00
6.50	0.14	0.03	0.00
6.75	0.15	0.04	0.00
7.00	0.16	0.04	0.00
7.25	0.17	0.05	0.00
7.50	0.18	0.06	0.00
7.75	0.19	0.06	0.00
8.00	0.20	0.07	0.00
8.25	0.21	0.08	0.00
8.50	0.22	0.09	0.00
8.75	0.24	0.09	0.00
9.00	0.25	0.10	0.00
9.25	0.27	0.12	0.01
9.50	0.29	0.13	0.01
9.75	0.31	0.15	0.01
10.00	0.33	0.17	0.01
10.25	0.35	0.19	0.01
10.50	0.38	0.21	0.01
10.75	0.41	0.24	0.02
11.00	0.46	0.28	0.02
11.25	0.52	0.34	0.03
11.50	0.60	0.41	0.03
11.75	0.74	0.54	0.07
12.00	1.11	0.90	**0.20**
12.25	1.66	1.44	**0.16**
12.50	1.80	1.58	0.06
12.75	1.88	1.65	0.03
13.00	1.94	1.71	0.03
13.25	1.99	1.76	0.02
13.50	2.02	1.80	0.02
13.75	2.05	1.82	0.01
14.00	2.07	1.84	0.01
14.25	2.09	1.87	0.01
14.50	2.11	1.89	0.01
14.75	2.13	1.91	0.01
15.00	2.15	1.93	0.01
15.25	2.16	1.94	0.01
15.50	2.18	1.95	0.01
15.75	2.19	1.96	0.01
16.00	2.20	1.97	0.01
16.25	2.21	1.98	0.00
16.50	2.22	1.99	0.00
16.75	2.23	2.00	0.00
17.00	2.24	2.01	0.00
17.25	2.25	2.02	0.00
17.50	2.26	2.03	0.00
17.75	2.27	2.04	0.00
18.00	2.28	2.05	0.00
18.25	2.29	2.06	0.00
18.50	2.29	2.07	0.00
18.75	2.30	2.07	0.00
19.00	2.31	2.08	0.00
19.25	2.32	2.09	0.00
19.50	2.32	2.10	0.00
19.75	2.33	2.10	0.00
20.00	**2.34**	**2.11**	0.00

Summary for Subcatchment 5S: Offsite Area 1

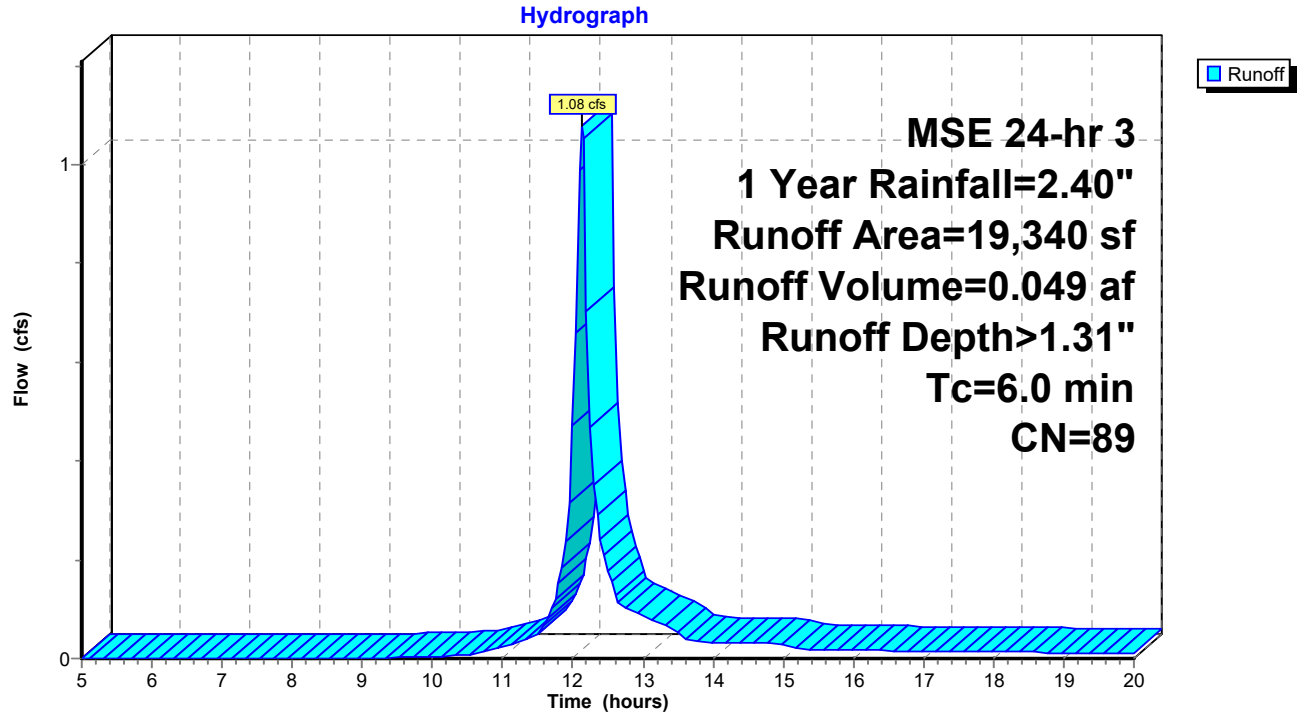
Runoff = 1.08 cfs @ 12.13 hrs, Volume= 0.049 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

Area (sf)	CN	Description
9,160	98	Paved parking, HSG D
10,180	80	>75% Grass cover, Good, HSG D
19,340	89	Weighted Average
10,180		52.64% Pervious Area
9,160		47.36% Impervious Area

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

Subcatchment 5S: Offsite Area 1



Hydrograph for Subcatchment 5S: Offsite Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.00	0.00
5.25	0.10	0.00	0.00
5.50	0.11	0.00	0.00
5.75	0.11	0.00	0.00
6.00	0.12	0.00	0.00
6.25	0.13	0.00	0.00
6.50	0.14	0.00	0.00
6.75	0.15	0.00	0.00
7.00	0.16	0.00	0.00
7.25	0.17	0.00	0.00
7.50	0.18	0.00	0.00
7.75	0.19	0.00	0.00
8.00	0.20	0.00	0.00
8.25	0.21	0.00	0.00
8.50	0.22	0.00	0.00
8.75	0.24	0.00	0.00
9.00	0.25	0.00	0.00
9.25	0.27	0.00	0.00
9.50	0.29	0.00	0.00
9.75	0.31	0.00	0.00
10.00	0.33	0.01	0.00
10.25	0.35	0.01	0.01
10.50	0.38	0.01	0.01
10.75	0.41	0.02	0.01
11.00	0.46	0.03	0.02
11.25	0.52	0.05	0.03
11.50	0.60	0.08	0.05
11.75	0.74	0.14	0.12
12.00	1.11	0.36	**0.47**
12.25	1.66	0.76	**0.47**
12.50	1.80	0.87	0.18
12.75	1.88	0.93	0.10
13.00	1.94	0.98	0.09
13.25	1.99	1.02	0.07
13.50	2.02	1.05	0.05
13.75	2.05	1.07	0.03
14.00	2.07	1.09	0.03
14.25	2.09	1.10	0.03
14.50	2.11	1.12	0.03
14.75	2.13	1.14	0.03
15.00	2.15	1.16	0.03
15.25	2.16	1.17	0.02
15.50	2.18	1.18	0.02
15.75	2.19	1.19	0.02
16.00	2.20	1.20	0.02
16.25	2.21	1.20	0.02
16.50	2.22	1.21	0.02
16.75	2.23	1.22	0.02
17.00	2.24	1.23	0.02
17.25	2.25	1.24	0.01
17.50	2.26	1.25	0.01
17.75	2.27	1.25	0.01
18.00	2.28	1.26	0.01
18.25	2.29	1.27	0.01
18.50	2.29	1.28	0.01
18.75	2.30	1.28	0.01
19.00	2.31	1.29	0.01
19.25	2.32	1.30	0.01
19.50	2.32	1.30	0.01
19.75	2.33	1.31	0.01
20.00	**2.34**	**1.31**	0.01

Summary for Subcatchment 6S: Offsite Area 2

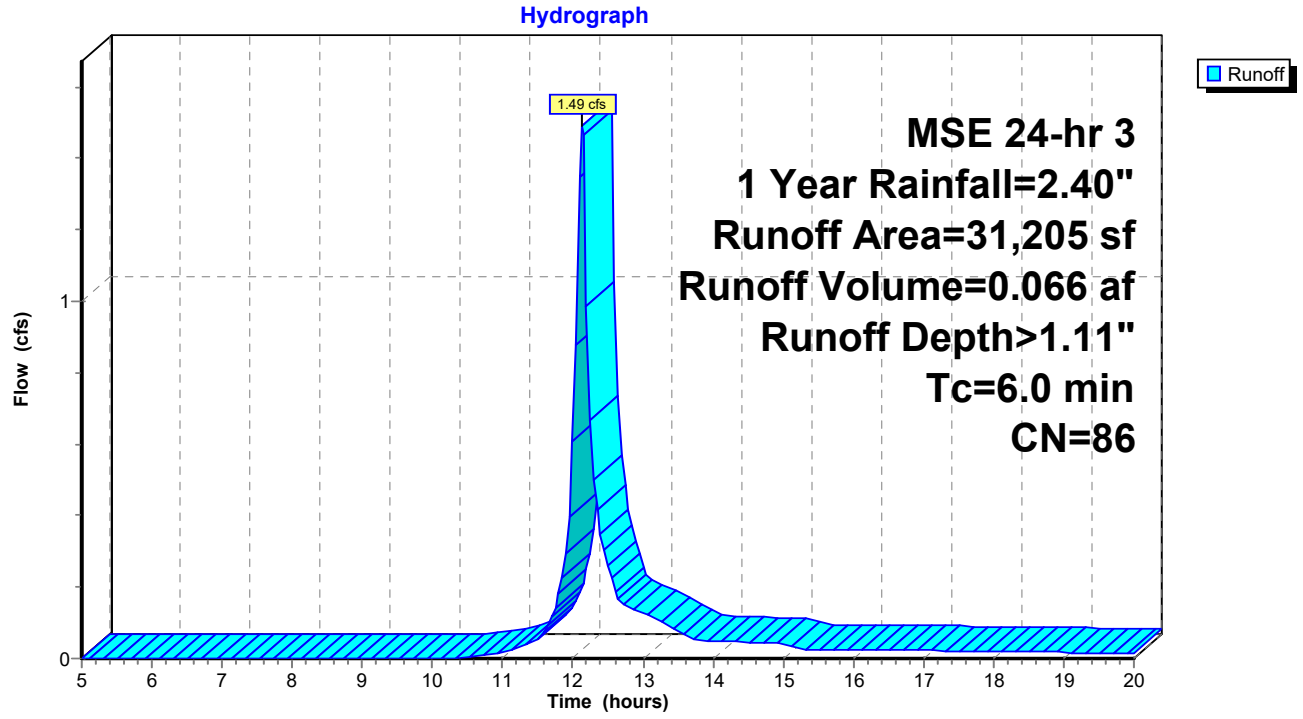
Runoff = 1.49 cfs @ 12.13 hrs, Volume= 0.066 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

Area (sf)	CN	Description
10,685	98	Paved parking, HSG D
20,520	80	>75% Grass cover, Good, HSG D
31,205	86	Weighted Average
20,520		65.76% Pervious Area
10,685		34.24% Impervious Area

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

Subcatchment 6S: Offsite Area 2



Hydrograph for Subcatchment 6S: Offsite Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.00	0.00
5.25	0.10	0.00	0.00
5.50	0.11	0.00	0.00
5.75	0.11	0.00	0.00
6.00	0.12	0.00	0.00
6.25	0.13	0.00	0.00
6.50	0.14	0.00	0.00
6.75	0.15	0.00	0.00
7.00	0.16	0.00	0.00
7.25	0.17	0.00	0.00
7.50	0.18	0.00	0.00
7.75	0.19	0.00	0.00
8.00	0.20	0.00	0.00
8.25	0.21	0.00	0.00
8.50	0.22	0.00	0.00
8.75	0.24	0.00	0.00
9.00	0.25	0.00	0.00
9.25	0.27	0.00	0.00
9.50	0.29	0.00	0.00
9.75	0.31	0.00	0.00
10.00	0.33	0.00	0.00
10.25	0.35	0.00	0.00
10.50	0.38	0.00	0.00
10.75	0.41	0.00	0.01
11.00	0.46	0.01	0.02
11.25	0.52	0.02	0.03
11.50	0.60	0.04	0.05
11.75	0.74	0.08	0.14
12.00	1.11	0.26	**0.61**
12.25	1.66	0.60	**0.67**
12.50	1.80	0.70	0.26
12.75	1.88	0.76	0.15
13.00	1.94	0.80	0.13
13.25	1.99	0.84	0.10
13.50	2.02	0.87	0.08
13.75	2.05	0.89	0.05
14.00	2.07	0.90	0.05
14.25	2.09	0.92	0.05
14.50	2.11	0.94	0.05
14.75	2.13	0.95	0.05
15.00	2.15	0.97	0.04
15.25	2.16	0.98	0.03
15.50	2.18	0.98	0.03
15.75	2.19	0.99	0.03
16.00	2.20	1.00	0.03
16.25	2.21	1.01	0.02
16.50	2.22	1.02	0.02
16.75	2.23	1.03	0.02
17.00	2.24	1.04	0.02
17.25	2.25	1.04	0.02
17.50	2.26	1.05	0.02
17.75	2.27	1.06	0.02
18.00	2.28	1.06	0.02
18.25	2.29	1.07	0.02
18.50	2.29	1.08	0.02
18.75	2.30	1.08	0.02
19.00	2.31	1.09	0.02
19.25	2.32	1.10	0.02
19.50	2.32	1.10	0.02
19.75	2.33	1.11	0.02
20.00	**2.34**	**1.11**	0.01

Summary for Subcatchment 7S: Watershed Area 2

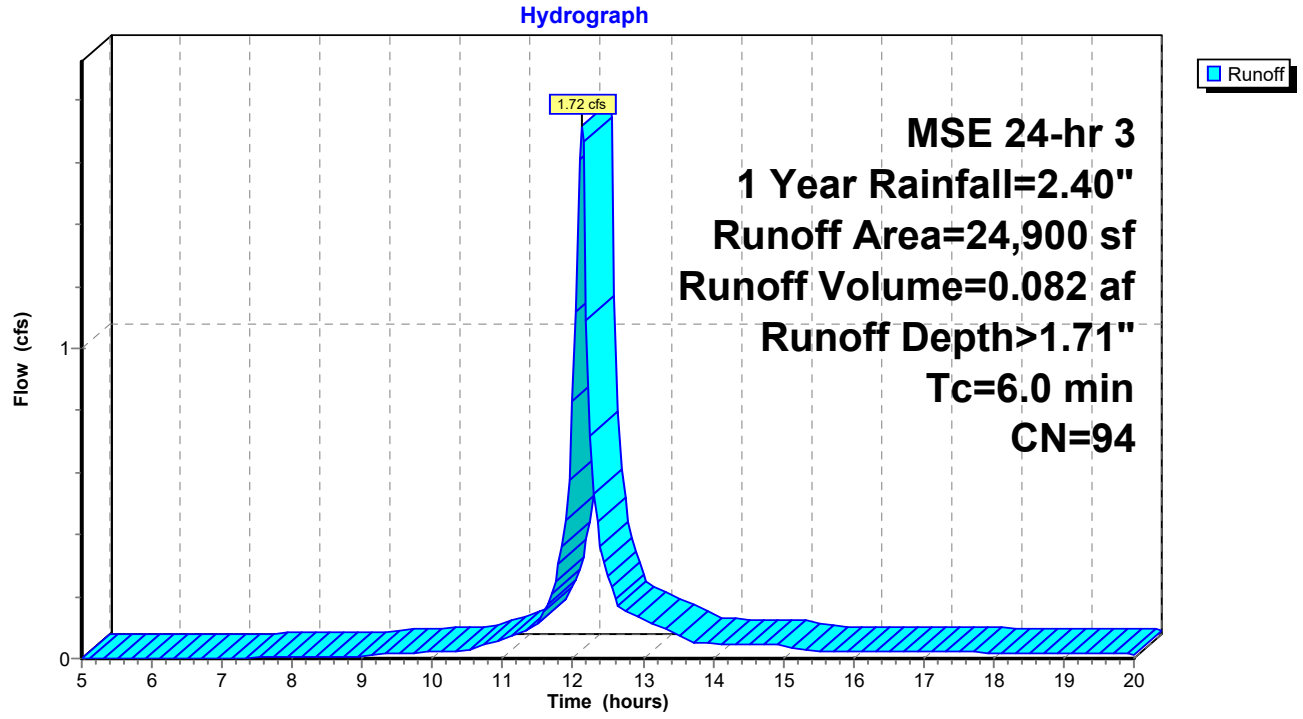
Runoff = 1.72 cfs @ 12.13 hrs, Volume= 0.082 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

Area (sf)	CN	Description
19,440	98	Paved parking, HSG D
5,460	80	>75% Grass cover, Good, HSG D
24,900	94	Weighted Average
5,460		21.93% Pervious Area
19,440		78.07% Impervious Area

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

Subcatchment 7S: Watershed Area 2



Hydrograph for Subcatchment 7S: Watershed Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.09	0.00	0.00
5.25	0.10	0.00	0.00
5.50	0.11	0.00	0.00
5.75	0.11	0.00	0.00
6.00	0.12	0.00	0.00
6.25	0.13	0.00	0.00
6.50	0.14	0.00	0.00
6.75	0.15	0.00	0.00
7.00	0.16	0.00	0.00
7.25	0.17	0.00	0.00
7.50	0.18	0.00	0.00
7.75	0.19	0.01	0.00
8.00	0.20	0.01	0.00
8.25	0.21	0.01	0.01
8.50	0.22	0.01	0.01
8.75	0.24	0.02	0.01
9.00	0.25	0.02	0.01
9.25	0.27	0.02	0.01
9.50	0.29	0.03	0.02
9.75	0.31	0.04	0.02
10.00	0.33	0.05	0.02
10.25	0.35	0.06	0.02
10.50	0.38	0.07	0.03
10.75	0.41	0.09	0.05
11.00	0.46	0.12	0.06
11.25	0.52	0.15	0.09
11.50	0.60	0.20	0.11
11.75	0.74	0.30	0.25
12.00	1.11	0.60	**0.83**
12.25	1.66	1.08	**0.72**
12.50	1.80	1.21	0.26
12.75	1.88	1.28	0.15
13.00	1.94	1.34	0.13
13.25	1.99	1.38	0.10
13.50	2.02	1.42	0.08
13.75	2.05	1.44	0.05
14.00	2.07	1.46	0.05
14.25	2.09	1.48	0.05
14.50	2.11	1.50	0.05
14.75	2.13	1.52	0.04
15.00	2.15	1.54	0.04
15.25	2.16	1.55	0.03
15.50	2.18	1.56	0.03
15.75	2.19	1.57	0.02
16.00	2.20	1.58	0.02
16.25	2.21	1.59	0.02
16.50	2.22	1.60	0.02
16.75	2.23	1.61	0.02
17.00	2.24	1.62	0.02
17.25	2.25	1.63	0.02
17.50	2.26	1.64	0.02
17.75	2.27	1.65	0.02
18.00	2.28	1.66	0.02
18.25	2.29	1.67	0.02
18.50	2.29	1.67	0.02
18.75	2.30	1.68	0.02
19.00	2.31	1.69	0.02
19.25	2.32	1.70	0.02
19.50	2.32	1.70	0.02
19.75	2.33	1.71	0.01
20.00	**2.34**	**1.71**	0.01

Summary for Pond 10P: Porous Pavement

Inflow Area = 0.572 ac, 78.07% Impervious, Inflow Depth > 1.71" for 1 Year event
Inflow = 1.72 cfs @ 12.13 hrs, Volume= 0.082 af
Outflow = 0.64 cfs @ 12.27 hrs, Volume= 0.079 af, Atten= 63%, Lag= 8.6 min
Primary = 0.64 cfs @ 12.27 hrs, Volume= 0.079 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 29.05' @ 12.27 hrs Surf.Area= 4,500 sf Storage= 1,281 cf

Plug-Flow detention time= 49.5 min calculated for 0.079 af (96% of inflow)
Center-of-Mass det. time= 35.4 min (799.0 - 763.6)

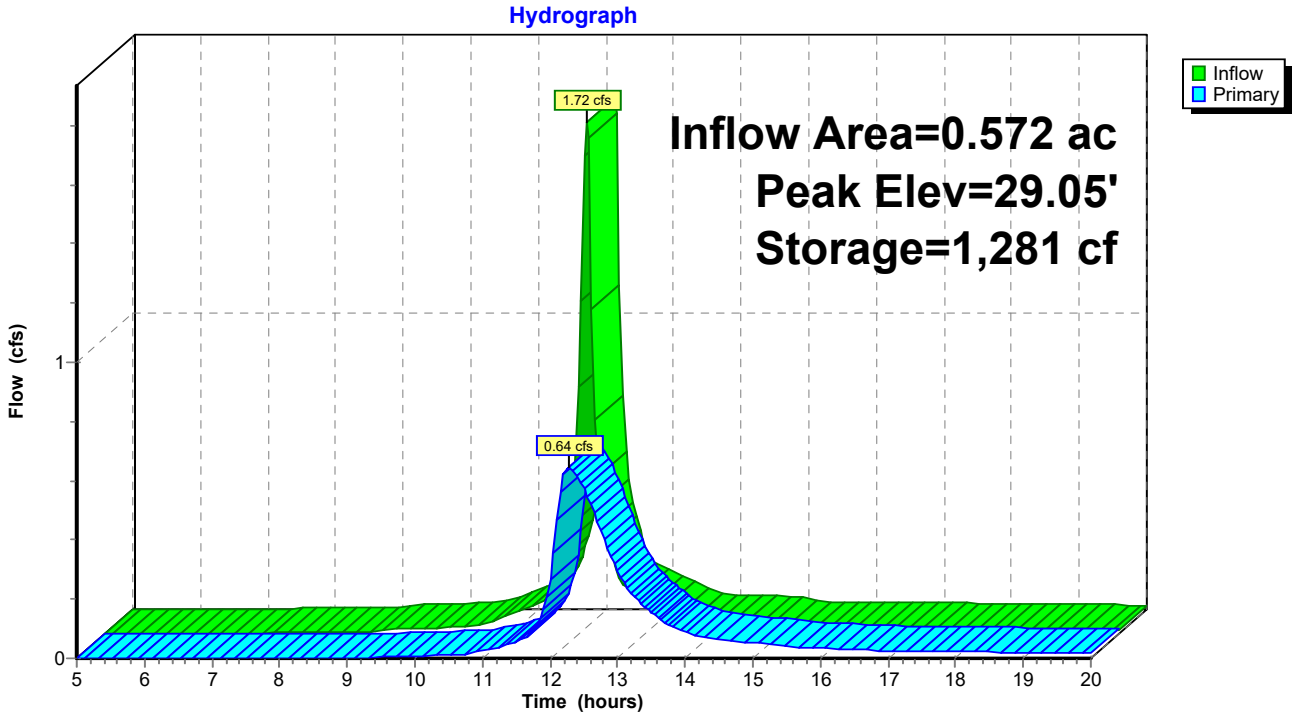
Volume	Invert	Avail.Storage	Storage Description
#1	28.34'	3,971 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.34	4,500	0.0	0	0
30.34	4,500	40.0	3,600	3,600
30.67	4,500	25.0	371	3,971

Device	Routing	Invert	Outlet Devices
#1	Primary	28.34'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.64 cfs @ 12.27 hrs HW=29.05' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.64 cfs @ 3.26 fps)

Pond 10P: Porous Pavement



Hydrograph for Pond 10P: Porous Pavement

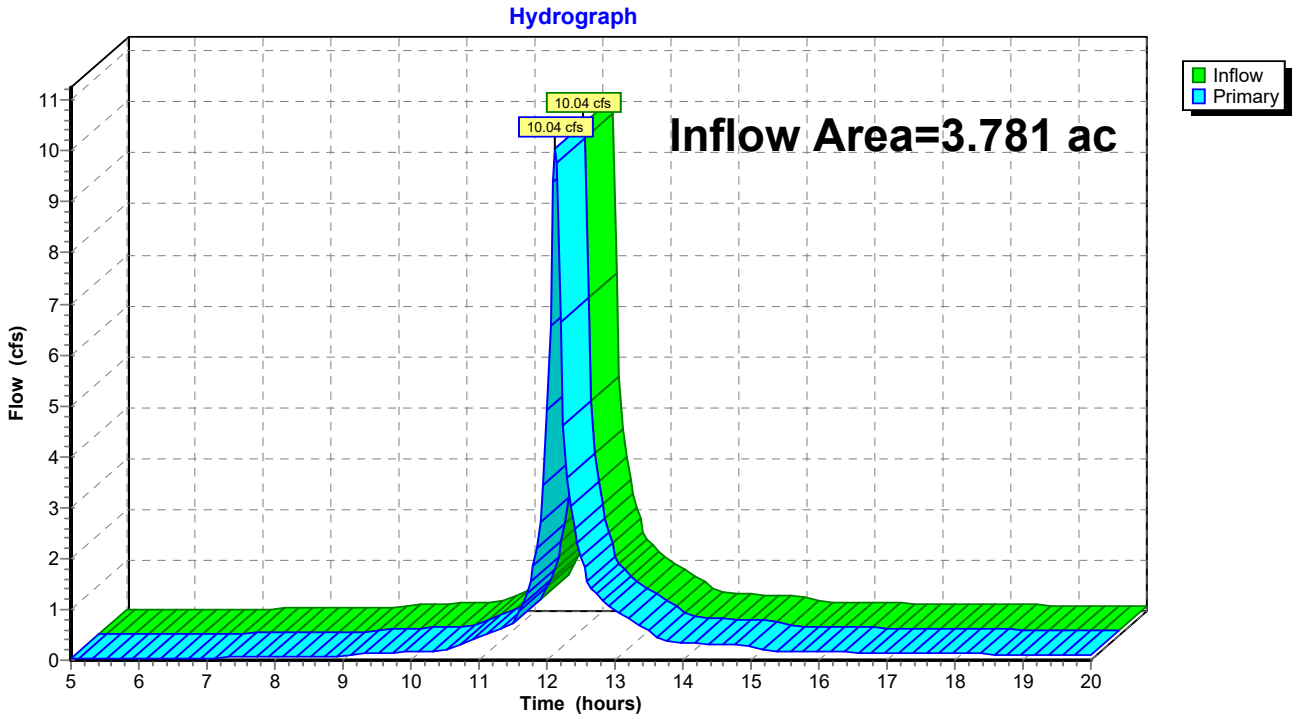
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	28.34	0.00
5.50	0.00	0	28.34	0.00
6.00	0.00	0	28.34	0.00
6.50	0.00	0	28.34	0.00
7.00	0.00	2	28.34	0.00
7.50	0.00	7	28.34	0.00
8.00	0.00	13	28.35	0.00
8.50	0.01	21	28.35	0.00
9.00	0.01	32	28.36	0.00
9.50	0.02	53	28.37	0.00
10.00	0.02	78	28.38	0.01
10.50	0.03	104	28.40	0.01
11.00	0.06	158	28.43	0.02
11.50	0.11	246	28.48	0.05
12.00	**0.83**	**589**	**28.67**	**0.27**
12.50	**0.26**	**1,106**	**28.95**	**0.57**
13.00	0.13	626	28.69	0.29
13.50	0.08	429	28.58	0.15
14.00	0.05	317	28.52	0.09
14.50	0.05	267	28.49	0.06
15.00	0.04	242	28.47	0.05
15.50	0.03	210	28.46	0.04
16.00	0.02	189	28.44	0.03
16.50	0.02	175	28.44	0.03
17.00	0.02	166	28.43	0.03
17.50	0.02	159	28.43	0.02
18.00	0.02	153	28.43	0.02
18.50	0.02	148	28.42	0.02
19.00	0.02	142	28.42	0.02
19.50	0.02	137	28.42	0.02
20.00	0.01	132	28.41	0.02

Summary for Link 1L: Proposed Total

Inflow Area = 3.781 ac, 78.04% Impervious, Inflow Depth > 1.75" for 1 Year event
Inflow = 10.04 cfs @ 12.13 hrs, Volume= 0.552 af
Primary = 10.04 cfs @ 12.13 hrs, Volume= 0.552 af, Atten= 0%, Lag= 0.0 min

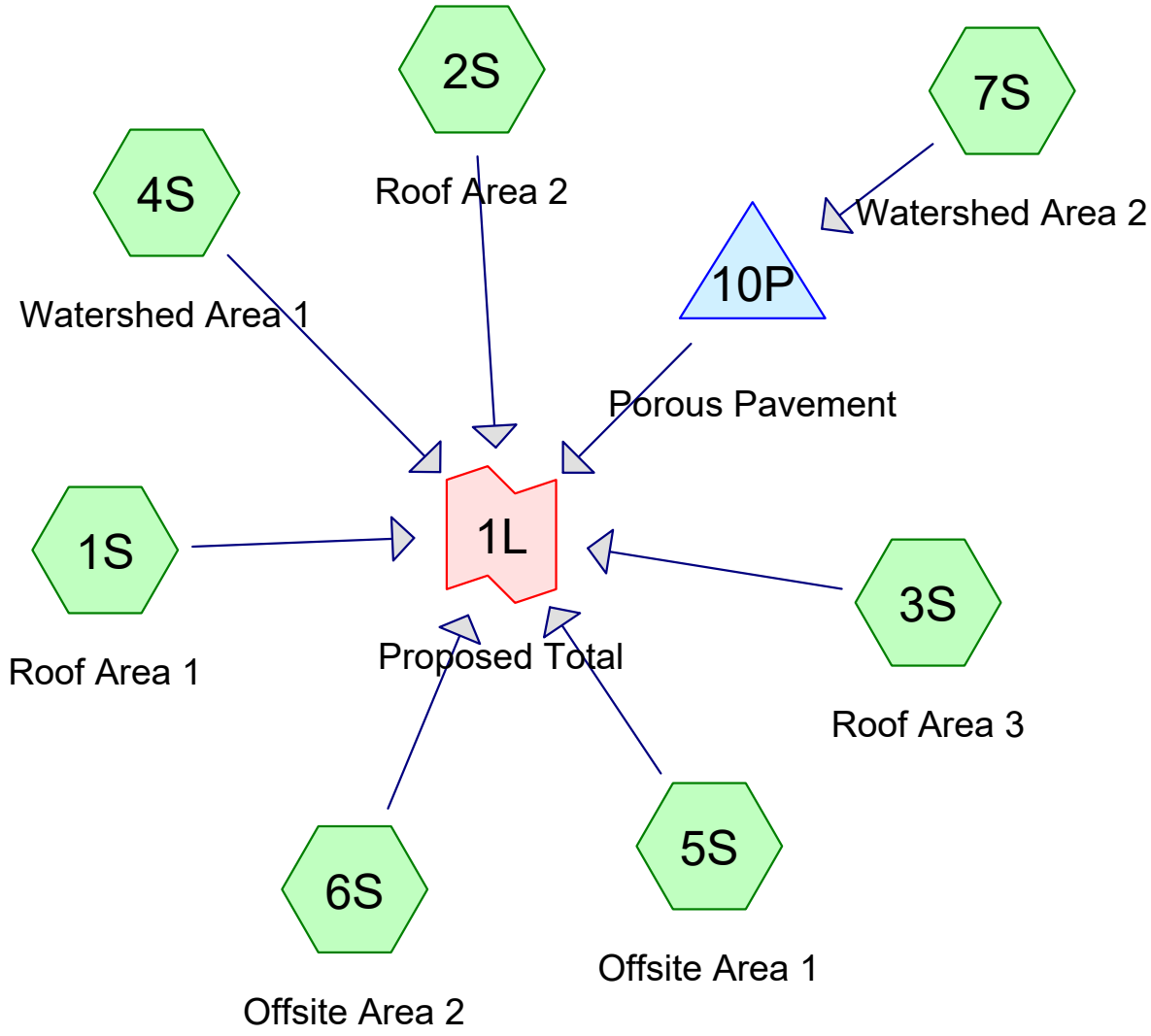
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 1L: Proposed Total



Hydrograph for Link 1L: Proposed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.02	**0.00**	0.02
5.25	0.02	0.00	0.02
5.50	0.03	0.00	0.03
5.75	0.03	0.00	0.03
6.00	0.03	0.00	0.03
6.25	0.04	0.00	0.04
6.50	0.04	0.00	0.04
6.75	0.04	0.00	0.04
7.00	0.05	0.00	0.05
7.25	0.05	0.00	0.05
7.50	0.05	0.00	0.05
7.75	0.06	0.00	0.06
8.00	0.06	0.00	0.06
8.25	0.07	0.00	0.07
8.50	0.07	0.00	0.07
8.75	0.07	0.00	0.07
9.00	0.08	0.00	0.08
9.25	0.13	0.00	0.13
9.50	0.14	0.00	0.14
9.75	0.15	0.00	0.15
10.00	0.16	0.00	0.16
10.25	0.17	0.00	0.17
10.50	0.18	0.00	0.18
10.75	0.32	0.00	0.32
11.00	0.44	0.00	0.44
11.25	0.57	0.00	0.57
11.50	0.72	0.00	0.72
11.75	1.53	0.00	1.53
12.00	**4.91**	0.00	**4.91**
12.25	**4.60**	0.00	**4.60**
12.50	2.03	0.00	2.03
12.75	1.27	0.00	1.27
13.00	0.99	0.00	0.99
13.25	0.78	0.00	0.78
13.50	0.59	0.00	0.59
13.75	0.39	0.00	0.39
14.00	0.35	0.00	0.35
14.25	0.33	0.00	0.33
14.50	0.31	0.00	0.31
14.75	0.30	0.00	0.30
15.00	0.29	0.00	0.29
15.25	0.19	0.00	0.19
15.50	0.18	0.00	0.18
15.75	0.17	0.00	0.17
16.00	0.17	0.00	0.17
16.25	0.16	0.00	0.16
16.50	0.16	0.00	0.16
16.75	0.15	0.00	0.15
17.00	0.14	0.00	0.14
17.25	0.14	0.00	0.14
17.50	0.14	0.00	0.14
17.75	0.13	0.00	0.13
18.00	0.13	0.00	0.13
18.25	0.12	0.00	0.12
18.50	0.12	0.00	0.12
18.75	0.11	0.00	0.11
19.00	0.11	0.00	0.11
19.25	0.11	0.00	0.11
19.50	0.10	0.00	0.10
19.75	0.10	0.00	0.10
20.00	0.09	0.00	0.09



Subcat Reach Pond Link

Routing Diagram for 19754 HydroCAD - Proposed
Prepared by The Sigma Group, Inc, Printed 7/29/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 Year	MSE 24-hr	3	Default	24.00	1	2.70	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.830	80	>75% Grass cover, Good, HSG D (5S, 6S, 7S)
1.015	98	Paved parking, HSG D (4S, 5S, 6S, 7S)
1.935	98	Roofs, HSG D (1S, 2S, 3S)
3.781	**94**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.781	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	Other	
3.781		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.830	0.000	0.830	>75% Grass cover, Good	5S, 6S, 7S
0.000	0.000	0.000	1.015	0.000	1.015	Paved parking	4S, 5S, 6S, 7S
0.000	0.000	0.000	1.935	0.000	1.935	Roofs	1S, 2S, 3S
0.000	**0.000**	**0.000**	**3.781**	**0.000**	**3.781**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Roof Area 1 Runoff Area=25,800 sf 100.00% Impervious Runoff Depth>2.39"
Tc=6.0 min CN=98 Runoff=2.27 cfs 0.118 af

Subcatchment2S: Roof Area 2 Runoff Area=26,590 sf 100.00% Impervious Runoff Depth>2.39"
Tc=6.0 min CN=98 Runoff=2.34 cfs 0.121 af

Subcatchment3S: Roof Area 3 Runoff Area=31,915 sf 100.00% Impervious Runoff Depth>2.39"
Tc=6.0 min CN=98 Runoff=2.81 cfs 0.146 af

Subcatchment4S: Watershed Area 1 Runoff Area=4,950 sf 100.00% Impervious Runoff Depth>2.39"
Tc=6.0 min CN=98 Runoff=0.44 cfs 0.023 af

Subcatchment5S: Offsite Area 1 Runoff Area=19,340 sf 47.36% Impervious Runoff Depth>1.57"
Tc=6.0 min CN=89 Runoff=1.28 cfs 0.058 af

Subcatchment6S: Offsite Area 2 Runoff Area=31,205 sf 34.24% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=86 Runoff=1.81 cfs 0.081 af

Subcatchment7S: Watershed Area 2 Runoff Area=24,900 sf 78.07% Impervious Runoff Depth>1.99"
Tc=6.0 min CN=94 Runoff=1.98 cfs 0.095 af

Pond 10P: Porous Pavement Peak Elev=29.16' Storage=1,474 cf Inflow=1.98 cfs 0.095 af
Outflow=0.71 cfs 0.092 af

Link 1L: Proposed Total Inflow=11.52 cfs 0.637 af
Primary=11.52 cfs 0.637 af

Total Runoff Area = 3.781 ac Runoff Volume = 0.641 af Average Runoff Depth = 2.03"
21.96% Pervious = 0.830 ac 78.04% Impervious = 2.951 ac

Summary for Subcatchment 1S: Roof Area 1

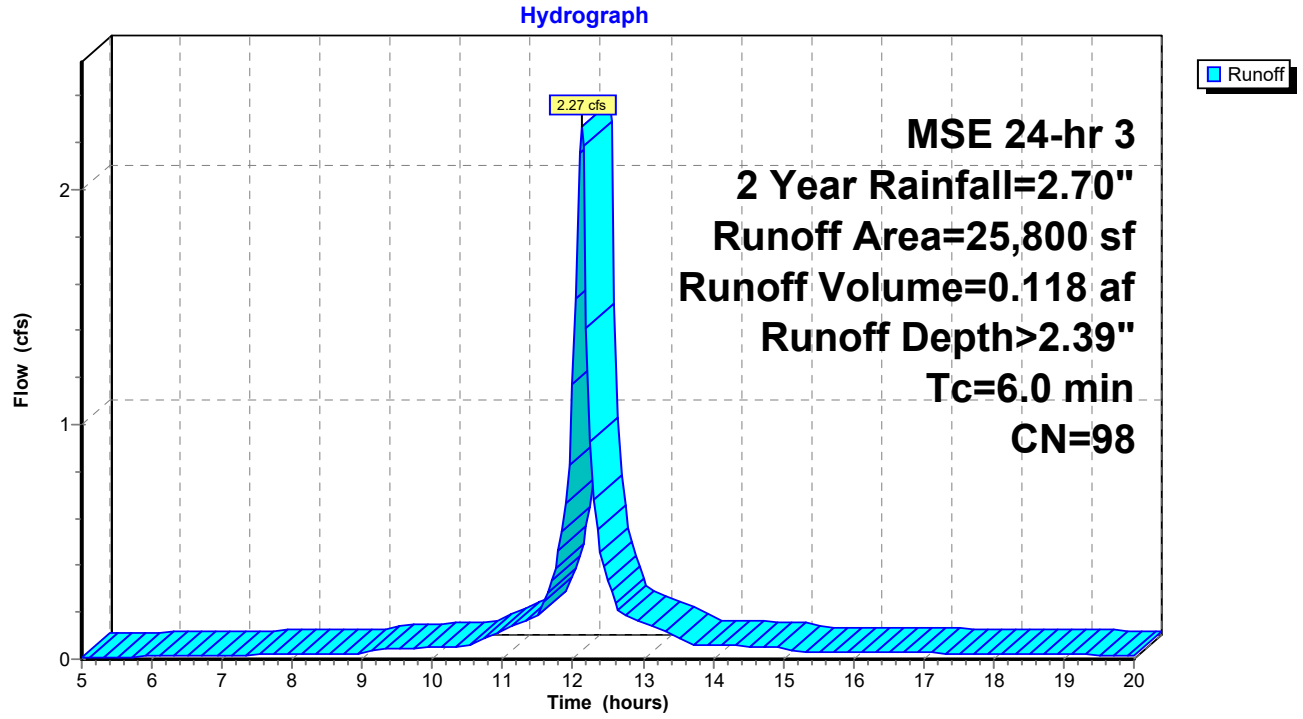
Runoff = 2.27 cfs @ 12.13 hrs, Volume= 0.118 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

Area (sf)	CN	Description
25,800	98	Roofs, HSG D
25,800		100.00% Impervious Area

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

Subcatchment 1S: Roof Area 1



Hydrograph for Subcatchment 1S: Roof Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.01	0.01
5.25	0.11	0.02	0.01
5.50	0.12	0.02	0.01
5.75	0.13	0.03	0.01
6.00	0.14	0.03	0.01
6.25	0.15	0.04	0.01
6.50	0.16	0.04	0.01
6.75	0.17	0.05	0.02
7.00	0.18	0.06	0.02
7.25	0.19	0.06	0.02
7.50	0.20	0.07	0.02
7.75	0.21	0.08	0.02
8.00	0.23	0.09	0.02
8.25	0.24	0.10	0.02
8.50	0.25	0.11	0.02
8.75	0.26	0.12	0.02
9.00	0.28	0.13	0.03
9.25	0.30	0.15	0.04
9.50	0.32	0.16	0.04
9.75	0.35	0.18	0.05
10.00	0.37	0.20	0.05
10.25	0.40	0.23	0.05
10.50	0.42	0.25	0.05
10.75	0.47	0.29	0.09
11.00	0.52	0.34	0.12
11.25	0.59	0.40	0.15
11.50	0.67	0.47	0.19
11.75	0.83	0.63	0.39
12.00	1.25	1.03	**1.17**
12.25	1.87	1.65	**0.92**
12.50	2.03	1.80	0.33
12.75	2.11	1.88	0.19
13.00	2.18	1.95	0.16
13.25	2.23	2.01	0.13
13.50	2.28	2.05	0.10
13.75	2.30	2.08	0.06
14.00	2.33	2.10	0.06
14.25	2.35	2.12	0.06
14.50	2.38	2.15	0.06
14.75	2.40	2.17	0.05
15.00	2.42	2.19	0.05
15.25	2.44	2.21	0.03
15.50	2.45	2.22	0.03
15.75	2.46	2.23	0.03
16.00	2.47	2.24	0.03
16.25	2.49	2.26	0.03
16.50	2.50	2.27	0.03
16.75	2.51	2.28	0.03
17.00	2.52	2.29	0.03
17.25	2.53	2.30	0.03
17.50	2.54	2.31	0.02
17.75	2.55	2.32	0.02
18.00	2.56	2.33	0.02
18.25	2.57	2.34	0.02
18.50	2.58	2.35	0.02
18.75	2.59	2.36	0.02
19.00	2.60	2.37	0.02
19.25	2.61	2.38	0.02
19.50	2.61	2.38	0.02
19.75	2.62	2.39	0.02
20.00	**2.63**	**2.40**	0.02

Summary for Subcatchment 2S: Roof Area 2

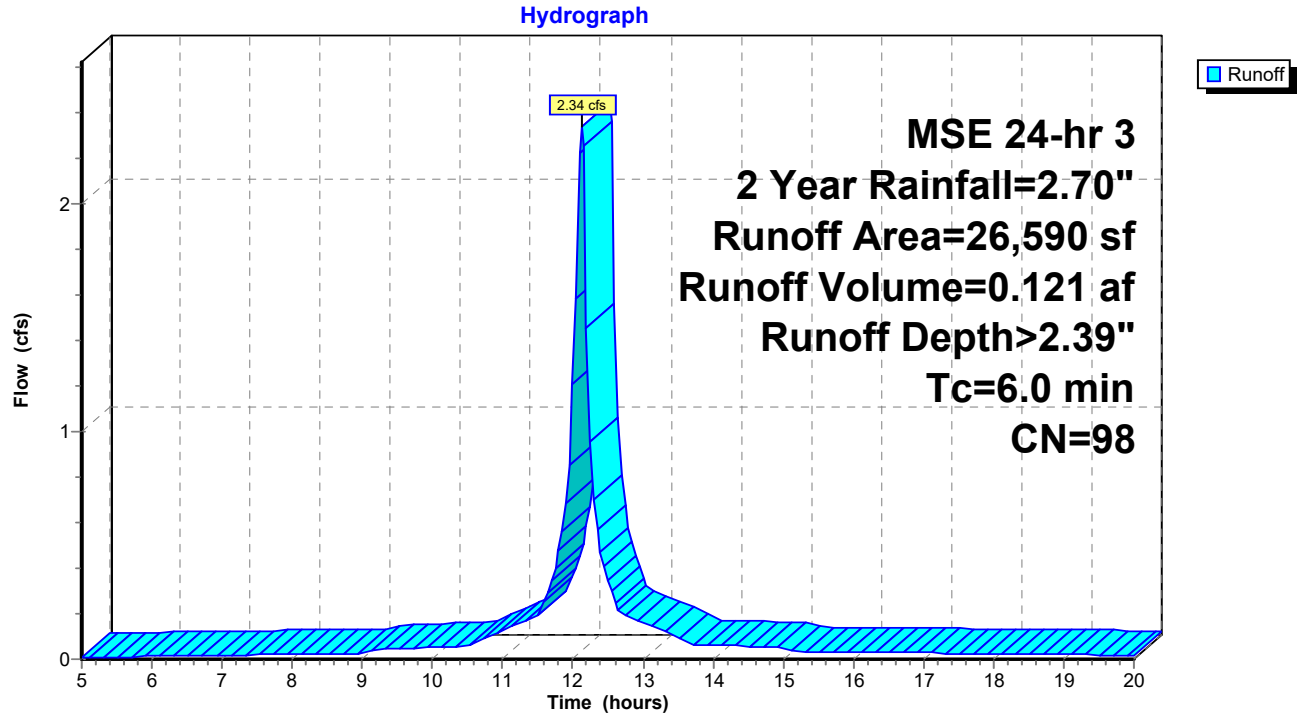
Runoff = 2.34 cfs @ 12.13 hrs, Volume= 0.121 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

Area (sf)	CN	Description
26,590	98	Roofs, HSG D
26,590		100.00% Impervious Area

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

Subcatchment 2S: Roof Area 2



Hydrograph for Subcatchment 2S: Roof Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.01	0.01
5.25	0.11	0.02	0.01
5.50	0.12	0.02	0.01
5.75	0.13	0.03	0.01
6.00	0.14	0.03	0.01
6.25	0.15	0.04	0.01
6.50	0.16	0.04	0.01
6.75	0.17	0.05	0.02
7.00	0.18	0.06	0.02
7.25	0.19	0.06	0.02
7.50	0.20	0.07	0.02
7.75	0.21	0.08	0.02
8.00	0.23	0.09	0.02
8.25	0.24	0.10	0.02
8.50	0.25	0.11	0.02
8.75	0.26	0.12	0.03
9.00	0.28	0.13	0.03
9.25	0.30	0.15	0.04
9.50	0.32	0.16	0.05
9.75	0.35	0.18	0.05
10.00	0.37	0.20	0.05
10.25	0.40	0.23	0.05
10.50	0.42	0.25	0.06
10.75	0.47	0.29	0.10
11.00	0.52	0.34	0.13
11.25	0.59	0.40	0.16
11.50	0.67	0.47	0.19
11.75	0.83	0.63	0.40
12.00	1.25	1.03	**1.20**
12.25	1.87	1.65	**0.95**
12.50	2.03	1.80	0.34
12.75	2.11	1.88	0.19
13.00	2.18	1.95	0.16
13.25	2.23	2.01	0.13
13.50	2.28	2.05	0.10
13.75	2.30	2.08	0.06
14.00	2.33	2.10	0.06
14.25	2.35	2.12	0.06
14.50	2.38	2.15	0.06
14.75	2.40	2.17	0.06
15.00	2.42	2.19	0.05
15.25	2.44	2.21	0.03
15.50	2.45	2.22	0.03
15.75	2.46	2.23	0.03
16.00	2.47	2.24	0.03
16.25	2.49	2.26	0.03
16.50	2.50	2.27	0.03
16.75	2.51	2.28	0.03
17.00	2.52	2.29	0.03
17.25	2.53	2.30	0.03
17.50	2.54	2.31	0.03
17.75	2.55	2.32	0.02
18.00	2.56	2.33	0.02
18.25	2.57	2.34	0.02
18.50	2.58	2.35	0.02
18.75	2.59	2.36	0.02
19.00	2.60	2.37	0.02
19.25	2.61	2.38	0.02
19.50	2.61	2.38	0.02
19.75	2.62	2.39	0.02
20.00	**2.63**	**2.40**	0.02

Summary for Subcatchment 3S: Roof Area 3

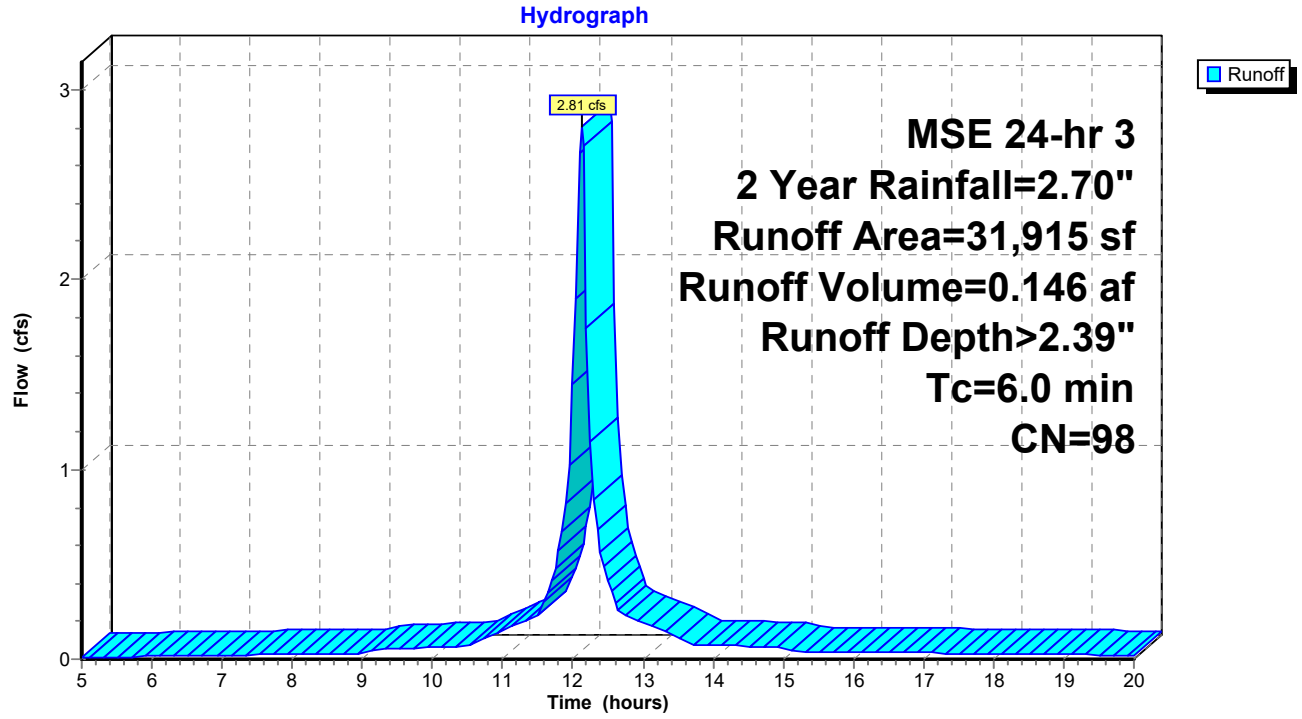
Runoff = 2.81 cfs @ 12.13 hrs, Volume= 0.146 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

Area (sf)	CN	Description
31,915	98	Roofs, HSG D
31,915		100.00% Impervious Area

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

Subcatchment 3S: Roof Area 3



Hydrograph for Subcatchment 3S: Roof Area 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.01	0.01
5.25	0.11	0.02	0.01
5.50	0.12	0.02	0.01
5.75	0.13	0.03	0.01
6.00	0.14	0.03	0.01
6.25	0.15	0.04	0.02
6.50	0.16	0.04	0.02
6.75	0.17	0.05	0.02
7.00	0.18	0.06	0.02
7.25	0.19	0.06	0.02
7.50	0.20	0.07	0.02
7.75	0.21	0.08	0.02
8.00	0.23	0.09	0.03
8.25	0.24	0.10	0.03
8.50	0.25	0.11	0.03
8.75	0.26	0.12	0.03
9.00	0.28	0.13	0.03
9.25	0.30	0.15	0.05
9.50	0.32	0.16	0.06
9.75	0.35	0.18	0.06
10.00	0.37	0.20	0.06
10.25	0.40	0.23	0.06
10.50	0.42	0.25	0.07
10.75	0.47	0.29	0.12
11.00	0.52	0.34	0.15
11.25	0.59	0.40	0.19
11.50	0.67	0.47	0.23
11.75	0.83	0.63	0.48
12.00	1.25	1.03	**1.44**
12.25	1.87	1.65	**1.14**
12.50	2.03	1.80	0.41
12.75	2.11	1.88	0.23
13.00	2.18	1.95	0.19
13.25	2.23	2.01	0.16
13.50	2.28	2.05	0.12
13.75	2.30	2.08	0.08
14.00	2.33	2.10	0.07
14.25	2.35	2.12	0.07
14.50	2.38	2.15	0.07
14.75	2.40	2.17	0.07
15.00	2.42	2.19	0.06
15.25	2.44	2.21	0.04
15.50	2.45	2.22	0.04
15.75	2.46	2.23	0.04
16.00	2.47	2.24	0.04
16.25	2.49	2.26	0.04
16.50	2.50	2.27	0.03
16.75	2.51	2.28	0.03
17.00	2.52	2.29	0.03
17.25	2.53	2.30	0.03
17.50	2.54	2.31	0.03
17.75	2.55	2.32	0.03
18.00	2.56	2.33	0.03
18.25	2.57	2.34	0.03
18.50	2.58	2.35	0.03
18.75	2.59	2.36	0.03
19.00	2.60	2.37	0.03
19.25	2.61	2.38	0.02
19.50	2.61	2.38	0.02
19.75	2.62	2.39	0.02
20.00	**2.63**	**2.40**	0.02

Summary for Subcatchment 4S: Watershed Area 1

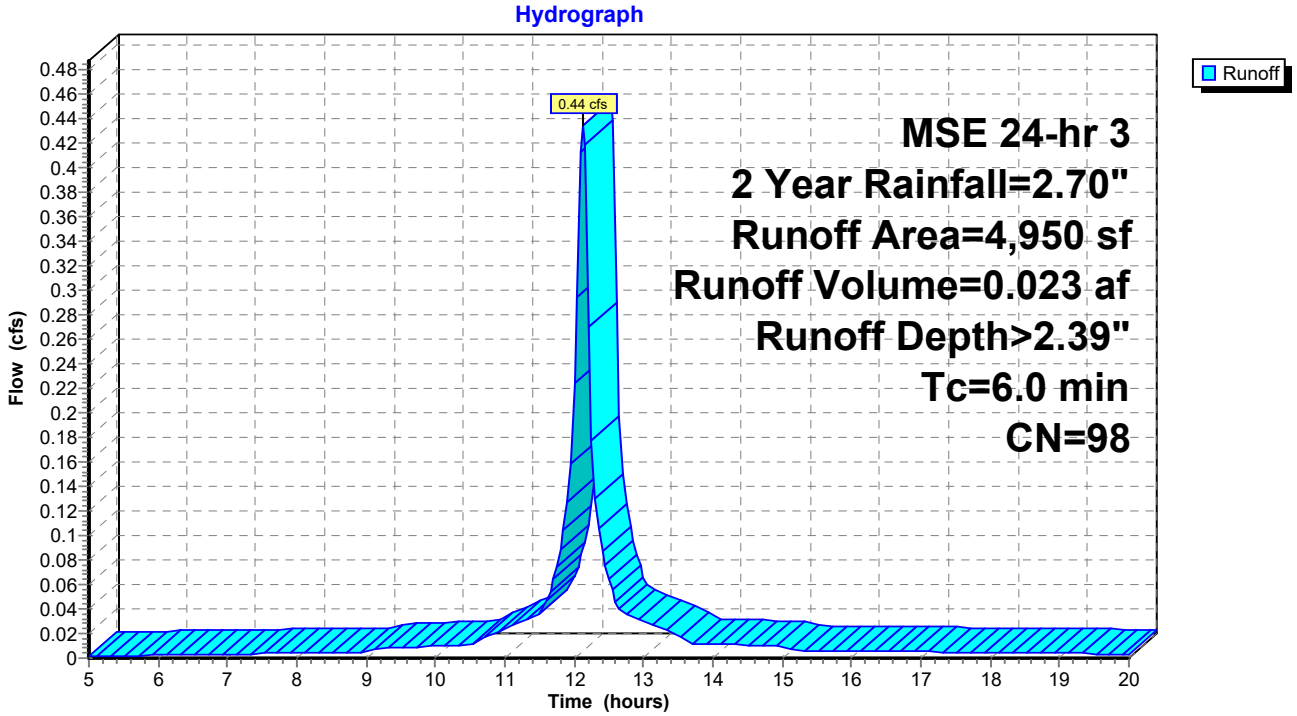
Runoff = 0.44 cfs @ 12.13 hrs, Volume= 0.023 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

Area (sf)	CN	Description
4,950	98	Paved parking, HSG D
0	80	>75% Grass cover, Good, HSG D
4,950	98	Weighted Average
4,950		100.00% Impervious Area

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

Subcatchment 4S: Watershed Area 1



Hydrograph for Subcatchment 4S: Watershed Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.01	0.00
5.25	0.11	0.02	0.00
5.50	0.12	0.02	0.00
5.75	0.13	0.03	0.00
6.00	0.14	0.03	0.00
6.25	0.15	0.04	0.00
6.50	0.16	0.04	0.00
6.75	0.17	0.05	0.00
7.00	0.18	0.06	0.00
7.25	0.19	0.06	0.00
7.50	0.20	0.07	0.00
7.75	0.21	0.08	0.00
8.00	0.23	0.09	0.00
8.25	0.24	0.10	0.00
8.50	0.25	0.11	0.00
8.75	0.26	0.12	0.00
9.00	0.28	0.13	0.00
9.25	0.30	0.15	0.01
9.50	0.32	0.16	0.01
9.75	0.35	0.18	0.01
10.00	0.37	0.20	0.01
10.25	0.40	0.23	0.01
10.50	0.42	0.25	0.01
10.75	0.47	0.29	0.02
11.00	0.52	0.34	0.02
11.25	0.59	0.40	0.03
11.50	0.67	0.47	0.04
11.75	0.83	0.63	0.07
12.00	1.25	1.03	**0.22**
12.25	1.87	1.65	**0.18**
12.50	2.03	1.80	0.06
12.75	2.11	1.88	0.04
13.00	2.18	1.95	0.03
13.25	2.23	2.01	0.02
13.50	2.28	2.05	0.02
13.75	2.30	2.08	0.01
14.00	2.33	2.10	0.01
14.25	2.35	2.12	0.01
14.50	2.38	2.15	0.01
14.75	2.40	2.17	0.01
15.00	2.42	2.19	0.01
15.25	2.44	2.21	0.01
15.50	2.45	2.22	0.01
15.75	2.46	2.23	0.01
16.00	2.47	2.24	0.01
16.25	2.49	2.26	0.01
16.50	2.50	2.27	0.01
16.75	2.51	2.28	0.01
17.00	2.52	2.29	0.01
17.25	2.53	2.30	0.00
17.50	2.54	2.31	0.00
17.75	2.55	2.32	0.00
18.00	2.56	2.33	0.00
18.25	2.57	2.34	0.00
18.50	2.58	2.35	0.00
18.75	2.59	2.36	0.00
19.00	2.60	2.37	0.00
19.25	2.61	2.38	0.00
19.50	2.61	2.38	0.00
19.75	2.62	2.39	0.00
20.00	**2.63**	**2.40**	0.00

Summary for Subcatchment 5S: Offsite Area 1

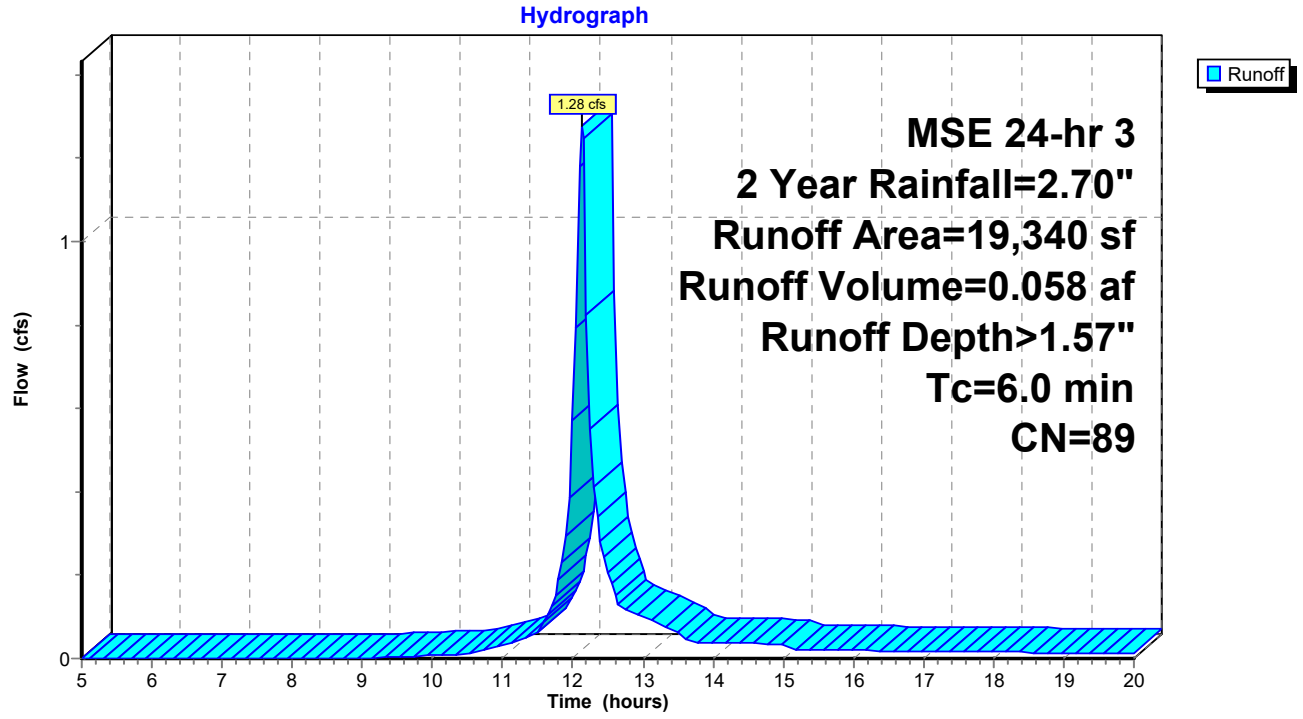
Runoff = 1.28 cfs @ 12.13 hrs, Volume= 0.058 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

Area (sf)	CN	Description
9,160	98	Paved parking, HSG D
10,180	80	>75% Grass cover, Good, HSG D
19,340	89	Weighted Average
10,180		52.64% Pervious Area
9,160		47.36% Impervious Area

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

Subcatchment 5S: Offsite Area 1



Hydrograph for Subcatchment 5S: Offsite Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.00	0.00
5.25	0.11	0.00	0.00
5.50	0.12	0.00	0.00
5.75	0.13	0.00	0.00
6.00	0.14	0.00	0.00
6.25	0.15	0.00	0.00
6.50	0.16	0.00	0.00
6.75	0.17	0.00	0.00
7.00	0.18	0.00	0.00
7.25	0.19	0.00	0.00
7.50	0.20	0.00	0.00
7.75	0.21	0.00	0.00
8.00	0.23	0.00	0.00
8.25	0.24	0.00	0.00
8.50	0.25	0.00	0.00
8.75	0.26	0.00	0.00
9.00	0.28	0.00	0.00
9.25	0.30	0.00	0.00
9.50	0.32	0.00	0.00
9.75	0.35	0.01	0.01
10.00	0.37	0.01	0.01
10.25	0.40	0.02	0.01
10.50	0.42	0.02	0.01
10.75	0.47	0.03	0.02
11.00	0.52	0.05	0.03
11.25	0.59	0.07	0.05
11.50	0.67	0.11	0.06
11.75	0.83	0.19	0.15
12.00	1.25	0.45	**0.57**
12.25	1.87	0.92	**0.55**
12.50	2.03	1.05	0.21
12.75	2.11	1.12	0.12
13.00	2.18	1.18	0.10
13.25	2.23	1.23	0.08
13.50	2.28	1.26	0.06
13.75	2.30	1.28	0.04
14.00	2.33	1.31	0.04
14.25	2.35	1.33	0.04
14.50	2.38	1.35	0.04
14.75	2.40	1.37	0.04
15.00	2.42	1.39	0.03
15.25	2.44	1.40	0.02
15.50	2.45	1.41	0.02
15.75	2.46	1.42	0.02
16.00	2.47	1.43	0.02
16.25	2.49	1.44	0.02
16.50	2.50	1.45	0.02
16.75	2.51	1.46	0.02
17.00	2.52	1.47	0.02
17.25	2.53	1.48	0.02
17.50	2.54	1.49	0.02
17.75	2.55	1.50	0.02
18.00	2.56	1.51	0.02
18.25	2.57	1.52	0.01
18.50	2.58	1.53	0.01
18.75	2.59	1.53	0.01
19.00	2.60	1.54	0.01
19.25	2.61	1.55	0.01
19.50	2.61	1.56	0.01
19.75	2.62	1.56	0.01
20.00	**2.63**	**1.57**	0.01

Summary for Subcatchment 6S: Offsite Area 2

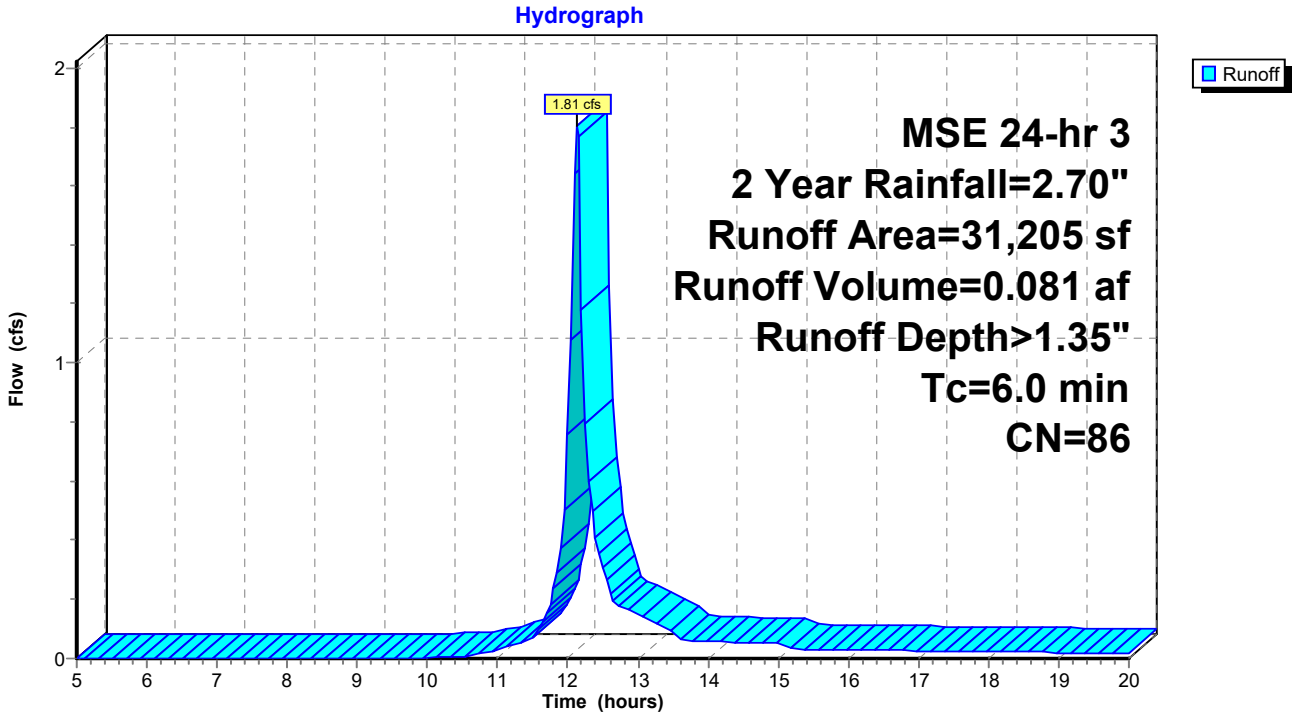
Runoff = 1.81 cfs @ 12.13 hrs, Volume= 0.081 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

Area (sf)	CN	Description
10,685	98	Paved parking, HSG D
20,520	80	>75% Grass cover, Good, HSG D
31,205	86	Weighted Average
20,520		65.76% Pervious Area
10,685		34.24% Impervious Area

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

Subcatchment 6S: Offsite Area 2



Hydrograph for Subcatchment 6S: Offsite Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.00	0.00
5.25	0.11	0.00	0.00
5.50	0.12	0.00	0.00
5.75	0.13	0.00	0.00
6.00	0.14	0.00	0.00
6.25	0.15	0.00	0.00
6.50	0.16	0.00	0.00
6.75	0.17	0.00	0.00
7.00	0.18	0.00	0.00
7.25	0.19	0.00	0.00
7.50	0.20	0.00	0.00
7.75	0.21	0.00	0.00
8.00	0.23	0.00	0.00
8.25	0.24	0.00	0.00
8.50	0.25	0.00	0.00
8.75	0.26	0.00	0.00
9.00	0.28	0.00	0.00
9.25	0.30	0.00	0.00
9.50	0.32	0.00	0.00
9.75	0.35	0.00	0.00
10.00	0.37	0.00	0.00
10.25	0.40	0.00	0.01
10.50	0.42	0.01	0.01
10.75	0.47	0.01	0.02
11.00	0.52	0.02	0.03
11.25	0.59	0.04	0.05
11.50	0.67	0.06	0.07
11.75	0.83	0.12	0.19
12.00	1.25	0.33	**0.76**
12.25	1.87	0.75	**0.80**
12.50	2.03	0.87	0.31
12.75	2.11	0.93	0.18
13.00	2.18	0.99	0.15
13.25	2.23	1.03	0.12
13.50	2.28	1.06	0.09
13.75	2.30	1.09	0.06
14.00	2.33	1.11	0.06
14.25	2.35	1.12	0.06
14.50	2.38	1.14	0.05
14.75	2.40	1.16	0.05
15.00	2.42	1.18	0.05
15.25	2.44	1.19	0.03
15.50	2.45	1.20	0.03
15.75	2.46	1.21	0.03
16.00	2.47	1.22	0.03
16.25	2.49	1.23	0.03
16.50	2.50	1.24	0.03
16.75	2.51	1.25	0.03
17.00	2.52	1.26	0.03
17.25	2.53	1.27	0.03
17.50	2.54	1.28	0.02
17.75	2.55	1.29	0.02
18.00	2.56	1.29	0.02
18.25	2.57	1.30	0.02
18.50	2.58	1.31	0.02
18.75	2.59	1.32	0.02
19.00	2.60	1.32	0.02
19.25	2.61	1.33	0.02
19.50	2.61	1.34	0.02
19.75	2.62	1.34	0.02
20.00	**2.63**	**1.35**	0.02

Summary for Subcatchment 7S: Watershed Area 2

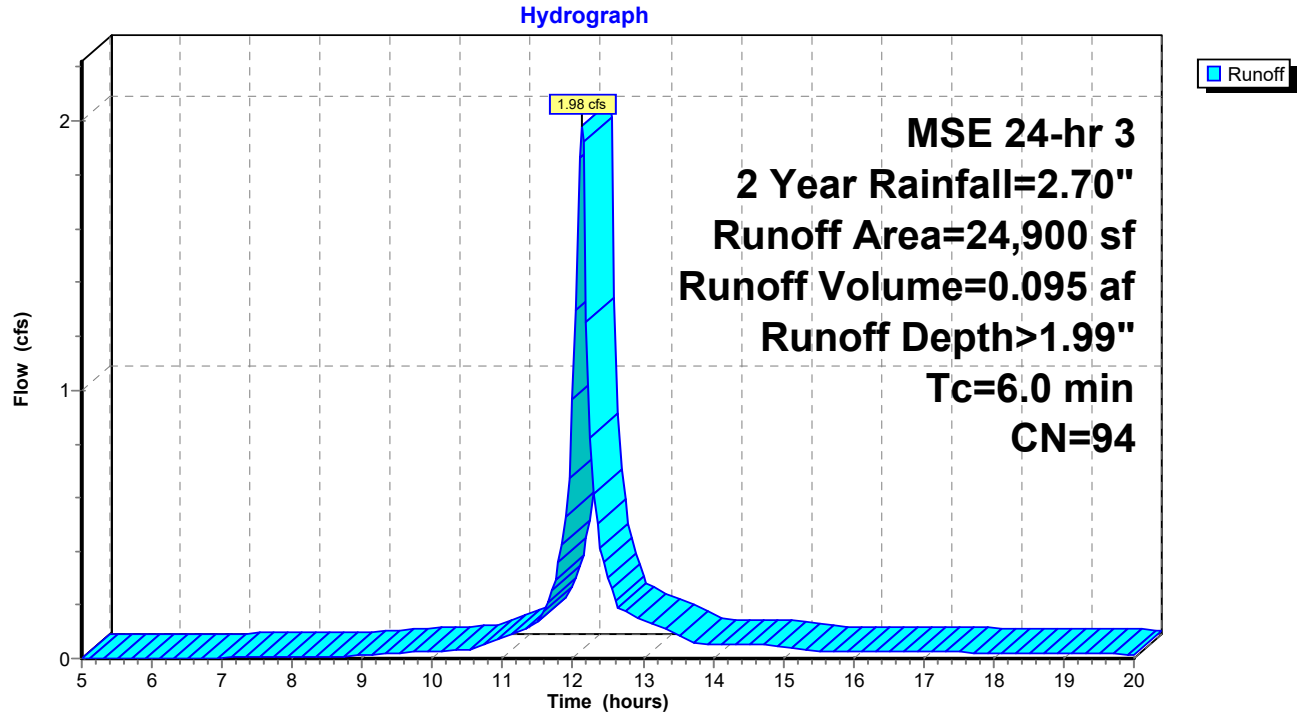
Runoff = 1.98 cfs @ 12.13 hrs, Volume= 0.095 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

Area (sf)	CN	Description
19,440	98	Paved parking, HSG D
5,460	80	>75% Grass cover, Good, HSG D
24,900	94	Weighted Average
5,460		21.93% Pervious Area
19,440		78.07% Impervious Area

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

Subcatchment 7S: Watershed Area 2



Hydrograph for Subcatchment 7S: Watershed Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.10	0.00	0.00
5.25	0.11	0.00	0.00
5.50	0.12	0.00	0.00
5.75	0.13	0.00	0.00
6.00	0.14	0.00	0.00
6.25	0.15	0.00	0.00
6.50	0.16	0.00	0.00
6.75	0.17	0.00	0.00
7.00	0.18	0.00	0.00
7.25	0.19	0.01	0.00
7.50	0.20	0.01	0.01
7.75	0.21	0.01	0.01
8.00	0.23	0.01	0.01
8.25	0.24	0.02	0.01
8.50	0.25	0.02	0.01
8.75	0.26	0.02	0.01
9.00	0.28	0.03	0.01
9.25	0.30	0.04	0.02
9.50	0.32	0.05	0.02
9.75	0.35	0.06	0.02
10.00	0.37	0.07	0.03
10.25	0.40	0.08	0.03
10.50	0.42	0.09	0.03
10.75	0.47	0.12	0.06
11.00	0.52	0.15	0.08
11.25	0.59	0.19	0.10
11.50	0.67	0.25	0.13
11.75	0.83	0.37	0.29
12.00	1.25	0.72	**0.97**
12.25	1.87	1.27	**0.82**
12.50	2.03	1.42	0.30
12.75	2.11	1.50	0.17
13.00	2.18	1.57	0.14
13.25	2.23	1.62	0.12
13.50	2.28	1.66	0.09
13.75	2.30	1.68	0.06
14.00	2.33	1.71	0.05
14.25	2.35	1.73	0.05
14.50	2.38	1.75	0.05
14.75	2.40	1.77	0.05
15.00	2.42	1.79	0.05
15.25	2.44	1.81	0.03
15.50	2.45	1.82	0.03
15.75	2.46	1.83	0.03
16.00	2.47	1.84	0.03
16.25	2.49	1.86	0.03
16.50	2.50	1.87	0.03
16.75	2.51	1.88	0.03
17.00	2.52	1.89	0.02
17.25	2.53	1.90	0.02
17.50	2.54	1.91	0.02
17.75	2.55	1.92	0.02
18.00	2.56	1.93	0.02
18.25	2.57	1.94	0.02
18.50	2.58	1.95	0.02
18.75	2.59	1.96	0.02
19.00	2.60	1.96	0.02
19.25	2.61	1.97	0.02
19.50	2.61	1.98	0.02
19.75	2.62	1.99	0.02
20.00	**2.63**	**1.99**	0.02

Summary for Pond 10P: Porous Pavement

Inflow Area = 0.572 ac, 78.07% Impervious, Inflow Depth > 1.99" for 2 Year event
Inflow = 1.98 cfs @ 12.13 hrs, Volume= 0.095 af
Outflow = 0.71 cfs @ 12.28 hrs, Volume= 0.092 af, Atten= 64%, Lag= 8.9 min
Primary = 0.71 cfs @ 12.28 hrs, Volume= 0.092 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 29.16' @ 12.28 hrs Surf.Area= 4,500 sf Storage= 1,474 cf

Plug-Flow detention time= 48.1 min calculated for 0.092 af (97% of inflow)
Center-of-Mass det. time= 35.1 min (796.0 - 760.9)

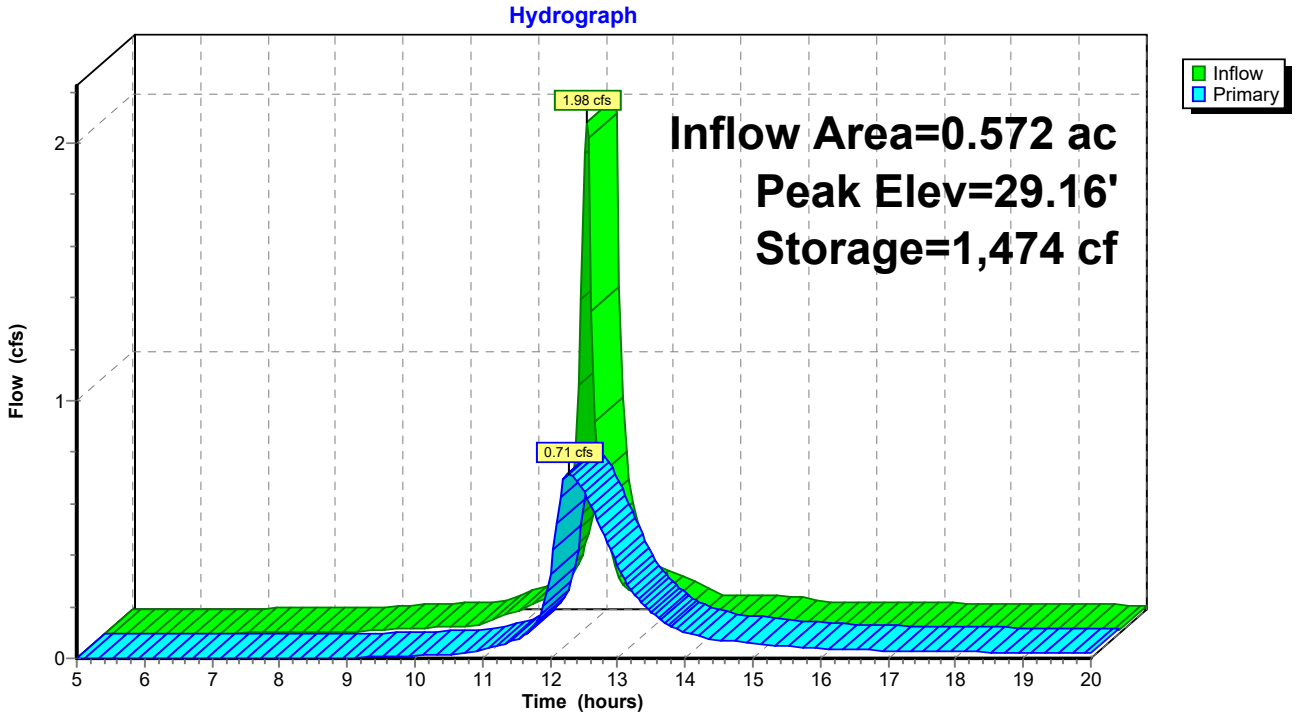
Volume	Invert	Avail.Storage	Storage Description
#1	28.34'	3,971 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.34	4,500	0.0	0	0
30.34	4,500	40.0	3,600	3,600
30.67	4,500	25.0	371	3,971

Device	Routing	Invert	Outlet Devices
#1	Primary	28.34'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.71 cfs @ 12.28 hrs HW=29.16' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.71 cfs @ 3.63 fps)

Pond 10P: Porous Pavement



Hydrograph for Pond 10P: Porous Pavement

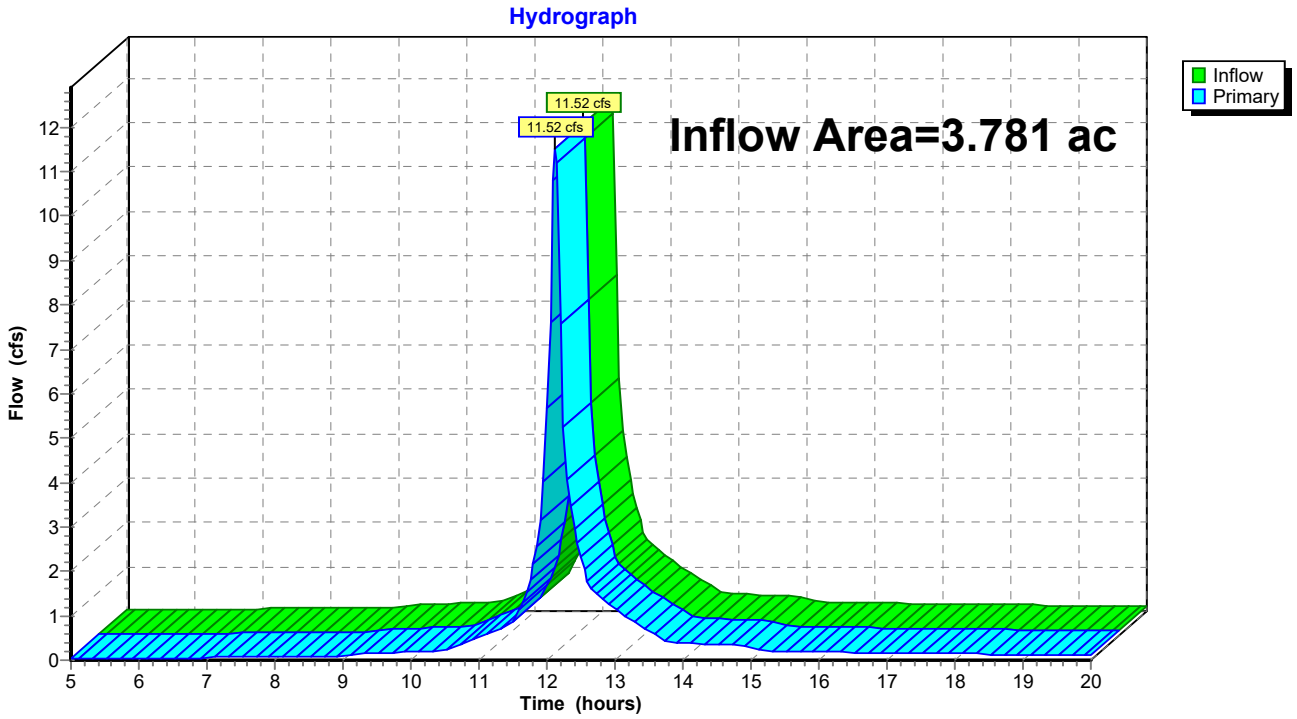
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	28.34	0.00
5.50	0.00	0	28.34	0.00
6.00	0.00	0	28.34	0.00
6.50	0.00	2	28.34	0.00
7.00	0.00	6	28.34	0.00
7.50	0.01	13	28.35	0.00
8.00	0.01	23	28.35	0.00
8.50	0.01	34	28.36	0.00
9.00	0.01	48	28.37	0.00
9.50	0.02	73	28.38	0.01
10.00	0.03	102	28.40	0.01
10.50	0.03	130	28.41	0.02
11.00	0.08	189	28.45	0.03
11.50	0.13	285	28.50	0.07
12.00	**0.97**	**670**	**28.71**	**0.33**
12.50	**0.30**	**1,289**	**29.06**	**0.65**
13.00	0.14	717	28.74	0.36
13.50	0.09	468	28.60	0.18
14.00	0.05	339	28.53	0.10
14.50	0.05	284	28.50	0.07
15.00	0.05	256	28.48	0.06
15.50	0.03	222	28.46	0.05
16.00	0.03	200	28.45	0.04
16.50	0.03	186	28.44	0.03
17.00	0.02	176	28.44	0.03
17.50	0.02	169	28.43	0.03
18.00	0.02	163	28.43	0.03
18.50	0.02	157	28.43	0.02
19.00	0.02	152	28.42	0.02
19.50	0.02	146	28.42	0.02
20.00	0.02	140	28.42	0.02

Summary for Link 1L: Proposed Total

Inflow Area = 3.781 ac, 78.04% Impervious, Inflow Depth > 2.02" for 2 Year event
Inflow = 11.52 cfs @ 12.13 hrs, Volume= 0.637 af
Primary = 11.52 cfs @ 12.13 hrs, Volume= 0.637 af, Atten= 0%, Lag= 0.0 min

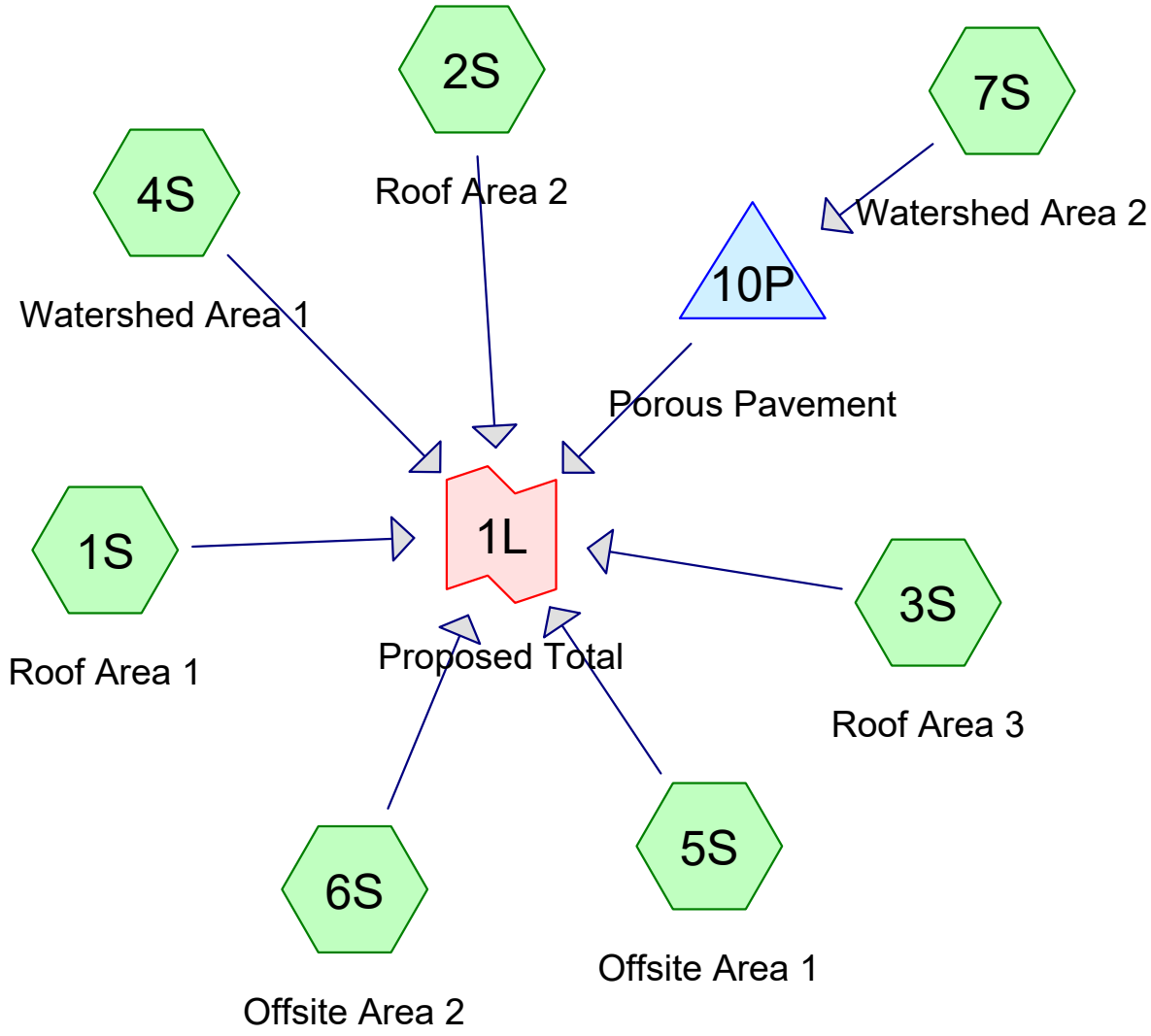
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 1L: Proposed Total



Hydrograph for Link 1L: Proposed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.03	**0.00**	0.03
5.25	0.03	0.00	0.03
5.50	0.03	0.00	0.03
5.75	0.04	0.00	0.04
6.00	0.04	0.00	0.04
6.25	0.05	0.00	0.05
6.50	0.05	0.00	0.05
6.75	0.05	0.00	0.05
7.00	0.06	0.00	0.06
7.25	0.06	0.00	0.06
7.50	0.07	0.00	0.07
7.75	0.07	0.00	0.07
8.00	0.07	0.00	0.07
8.25	0.08	0.00	0.08
8.50	0.08	0.00	0.08
8.75	0.09	0.00	0.09
9.00	0.09	0.00	0.09
9.25	0.15	0.00	0.15
9.50	0.16	0.00	0.16
9.75	0.18	0.00	0.18
10.00	0.19	0.00	0.19
10.25	0.21	0.00	0.21
10.50	0.22	0.00	0.22
10.75	0.38	0.00	0.38
11.00	0.52	0.00	0.52
11.25	0.67	0.00	0.67
11.50	0.85	0.00	0.85
11.75	1.80	0.00	1.80
12.00	**5.69**	0.00	**5.69**
12.25	**5.25**	0.00	**5.25**
12.50	2.31	0.00	2.31
12.75	1.46	0.00	1.46
13.00	1.16	0.00	1.16
13.25	0.90	0.00	0.90
13.50	0.67	0.00	0.67
13.75	0.44	0.00	0.44
14.00	0.40	0.00	0.40
14.25	0.38	0.00	0.38
14.50	0.36	0.00	0.36
14.75	0.34	0.00	0.34
15.00	0.32	0.00	0.32
15.25	0.22	0.00	0.22
15.50	0.20	0.00	0.20
15.75	0.20	0.00	0.20
16.00	0.19	0.00	0.19
16.25	0.18	0.00	0.18
16.50	0.18	0.00	0.18
16.75	0.17	0.00	0.17
17.00	0.16	0.00	0.16
17.25	0.16	0.00	0.16
17.50	0.15	0.00	0.15
17.75	0.15	0.00	0.15
18.00	0.14	0.00	0.14
18.25	0.14	0.00	0.14
18.50	0.14	0.00	0.14
18.75	0.13	0.00	0.13
19.00	0.13	0.00	0.13
19.25	0.12	0.00	0.12
19.50	0.12	0.00	0.12
19.75	0.11	0.00	0.11
20.00	0.11	0.00	0.11



Subcat Reach Pond Link

Routing Diagram for 19754 HydroCAD - Proposed
Prepared by The Sigma Group, Inc, Printed 7/29/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10 Year	MSE 24-hr	3	Default	24.00	1	3.81	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.830	80	>75% Grass cover, Good, HSG D (5S, 6S, 7S)
1.015	98	Paved parking, HSG D (4S, 5S, 6S, 7S)
1.935	98	Roofs, HSG D (1S, 2S, 3S)
3.781	**94**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.781	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	Other	
3.781		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.830	0.000	0.830	>75% Grass cover, Good	5S, 6S, 7S
0.000	0.000	0.000	1.015	0.000	1.015	Paved parking	4S, 5S, 6S, 7S
0.000	0.000	0.000	1.935	0.000	1.935	Roofs	1S, 2S, 3S
0.000	**0.000**	**0.000**	**3.781**	**0.000**	**3.781**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Roof Area 1 Runoff Area=25,800 sf 100.00% Impervious Runoff Depth>3.44"
Tc=6.0 min CN=98 Runoff=3.23 cfs 0.170 af

Subcatchment2S: Roof Area 2 Runoff Area=26,590 sf 100.00% Impervious Runoff Depth>3.44"
Tc=6.0 min CN=98 Runoff=3.33 cfs 0.175 af

Subcatchment3S: Roof Area 3 Runoff Area=31,915 sf 100.00% Impervious Runoff Depth>3.44"
Tc=6.0 min CN=98 Runoff=3.99 cfs 0.210 af

Subcatchment4S: Watershed Area 1 Runoff Area=4,950 sf 100.00% Impervious Runoff Depth>3.44"
Tc=6.0 min CN=98 Runoff=0.62 cfs 0.033 af

Subcatchment5S: Offsite Area 1 Runoff Area=19,340 sf 47.36% Impervious Runoff Depth>2.55"
Tc=6.0 min CN=89 Runoff=2.03 cfs 0.094 af

Subcatchment6S: Offsite Area 2 Runoff Area=31,205 sf 34.24% Impervious Runoff Depth>2.28"
Tc=6.0 min CN=86 Runoff=2.99 cfs 0.136 af

Subcatchment7S: Watershed Area 2 Runoff Area=24,900 sf 78.07% Impervious Runoff Depth>3.04"
Tc=6.0 min CN=94 Runoff=2.94 cfs 0.145 af

Pond 10P: Porous Pavement Peak Elev=29.58' Storage=2,232 cf Inflow=2.94 cfs 0.145 af
Outflow=0.94 cfs 0.141 af

Link 1L: Proposed Total Inflow=16.96 cfs 0.959 af
Primary=16.96 cfs 0.959 af

Total Runoff Area = 3.781 ac Runoff Volume = 0.963 af Average Runoff Depth = 3.06"
21.96% Pervious = 0.830 ac 78.04% Impervious = 2.951 ac

Summary for Subcatchment 1S: Roof Area 1

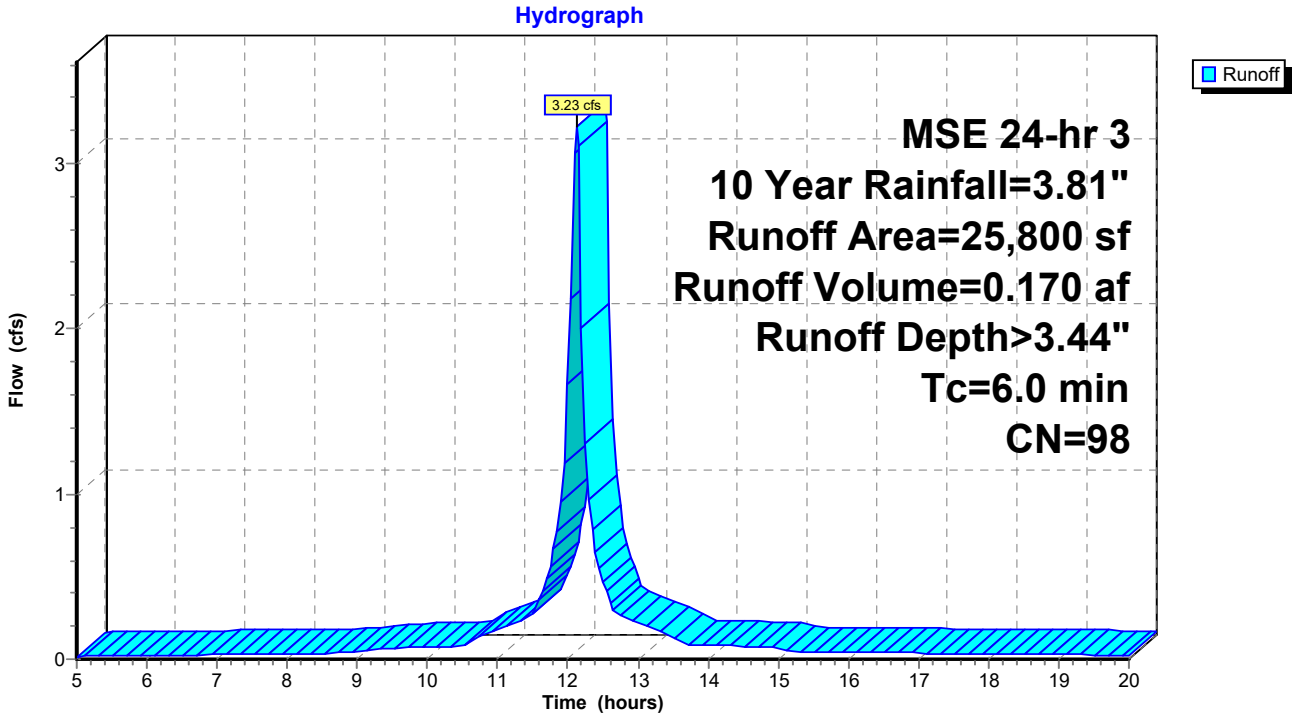
Runoff = 3.23 cfs @ 12.13 hrs, Volume= 0.170 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

Area (sf)	CN	Description
25,800	98	Roofs, HSG D
25,800		100.00% Impervious Area

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

Subcatchment 1S: Roof Area 1



Hydrograph for Subcatchment 1S: Roof Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.14	0.03	0.02
5.25	0.16	0.04	0.02
5.50	0.17	0.05	0.02
5.75	0.18	0.06	0.02
6.00	0.19	0.07	0.02
6.25	0.21	0.08	0.02
6.50	0.22	0.09	0.02
6.75	0.24	0.10	0.03
7.00	0.25	0.11	0.03
7.25	0.27	0.12	0.03
7.50	0.28	0.13	0.03
7.75	0.30	0.15	0.03
8.00	0.32	0.16	0.03
8.25	0.34	0.18	0.04
8.50	0.35	0.19	0.04
8.75	0.37	0.21	0.04
9.00	0.39	0.22	0.04
9.25	0.42	0.25	0.07
9.50	0.46	0.28	0.07
9.75	0.49	0.31	0.07
10.00	0.52	0.34	0.07
10.25	0.56	0.37	0.08
10.50	0.60	0.41	0.08
10.75	0.66	0.46	0.14
11.00	0.73	0.54	0.18
11.25	0.83	0.63	0.22
11.50	0.94	0.74	0.27
11.75	1.17	0.96	0.56
12.00	1.76	1.54	**1.67**
12.25	2.64	2.41	**1.31**
12.50	2.87	2.63	0.47
12.75	2.98	2.75	0.27
13.00	3.08	2.84	0.22
13.25	3.15	2.92	0.18
13.50	3.21	2.98	0.14
13.75	3.25	3.02	0.09
14.00	3.29	3.05	0.08
14.25	3.32	3.09	0.08
14.50	3.35	3.12	0.08
14.75	3.39	3.15	0.08
15.00	3.42	3.18	0.07
15.25	3.44	3.20	0.05
15.50	3.46	3.22	0.04
15.75	3.47	3.24	0.04
16.00	3.49	3.26	0.04
16.25	3.51	3.27	0.04
16.50	3.53	3.29	0.04
16.75	3.54	3.31	0.04
17.00	3.56	3.32	0.04
17.25	3.57	3.34	0.04
17.50	3.59	3.35	0.04
17.75	3.60	3.37	0.03
18.00	3.62	3.38	0.03
18.25	3.63	3.40	0.03
18.50	3.64	3.41	0.03
18.75	3.65	3.42	0.03
19.00	3.67	3.43	0.03
19.25	3.68	3.44	0.03
19.50	3.69	3.46	0.03
19.75	3.70	3.47	0.03
20.00	**3.71**	**3.48**	0.02

Summary for Subcatchment 2S: Roof Area 2

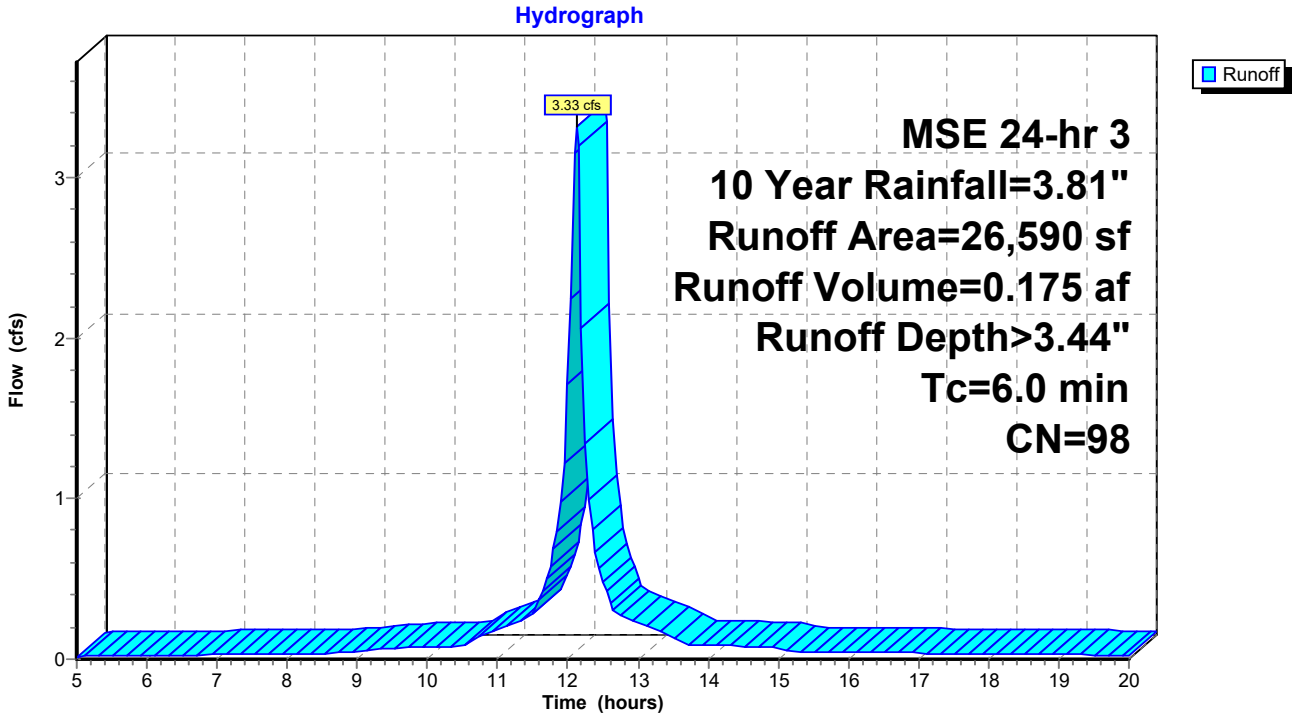
Runoff = 3.33 cfs @ 12.13 hrs, Volume= 0.175 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

Area (sf)	CN	Description
26,590	98	Roofs, HSG D
26,590		100.00% Impervious Area

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

Subcatchment 2S: Roof Area 2



Hydrograph for Subcatchment 2S: Roof Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.14	0.03	0.02
5.25	0.16	0.04	0.02
5.50	0.17	0.05	0.02
5.75	0.18	0.06	0.02
6.00	0.19	0.07	0.02
6.25	0.21	0.08	0.02
6.50	0.22	0.09	0.03
6.75	0.24	0.10	0.03
7.00	0.25	0.11	0.03
7.25	0.27	0.12	0.03
7.50	0.28	0.13	0.03
7.75	0.30	0.15	0.03
8.00	0.32	0.16	0.03
8.25	0.34	0.18	0.04
8.50	0.35	0.19	0.04
8.75	0.37	0.21	0.04
9.00	0.39	0.22	0.04
9.25	0.42	0.25	0.07
9.50	0.46	0.28	0.07
9.75	0.49	0.31	0.07
10.00	0.52	0.34	0.08
10.25	0.56	0.37	0.08
10.50	0.60	0.41	0.08
10.75	0.66	0.46	0.14
11.00	0.73	0.54	0.19
11.25	0.83	0.63	0.23
11.50	0.94	0.74	0.28
11.75	1.17	0.96	0.57
12.00	1.76	1.54	**1.72**
12.25	2.64	2.41	**1.35**
12.50	2.87	2.63	0.49
12.75	2.98	2.75	0.28
13.00	3.08	2.84	0.23
13.25	3.15	2.92	0.19
13.50	3.21	2.98	0.14
13.75	3.25	3.02	0.09
14.00	3.29	3.05	0.09
14.25	3.32	3.09	0.08
14.50	3.35	3.12	0.08
14.75	3.39	3.15	0.08
15.00	3.42	3.18	0.08
15.25	3.44	3.20	0.05
15.50	3.46	3.22	0.05
15.75	3.47	3.24	0.04
16.00	3.49	3.26	0.04
16.25	3.51	3.27	0.04
16.50	3.53	3.29	0.04
16.75	3.54	3.31	0.04
17.00	3.56	3.32	0.04
17.25	3.57	3.34	0.04
17.50	3.59	3.35	0.04
17.75	3.60	3.37	0.04
18.00	3.62	3.38	0.03
18.25	3.63	3.40	0.03
18.50	3.64	3.41	0.03
18.75	3.65	3.42	0.03
19.00	3.67	3.43	0.03
19.25	3.68	3.44	0.03
19.50	3.69	3.46	0.03
19.75	3.70	3.47	0.03
20.00	**3.71**	**3.48**	0.02

Summary for Subcatchment 3S: Roof Area 3

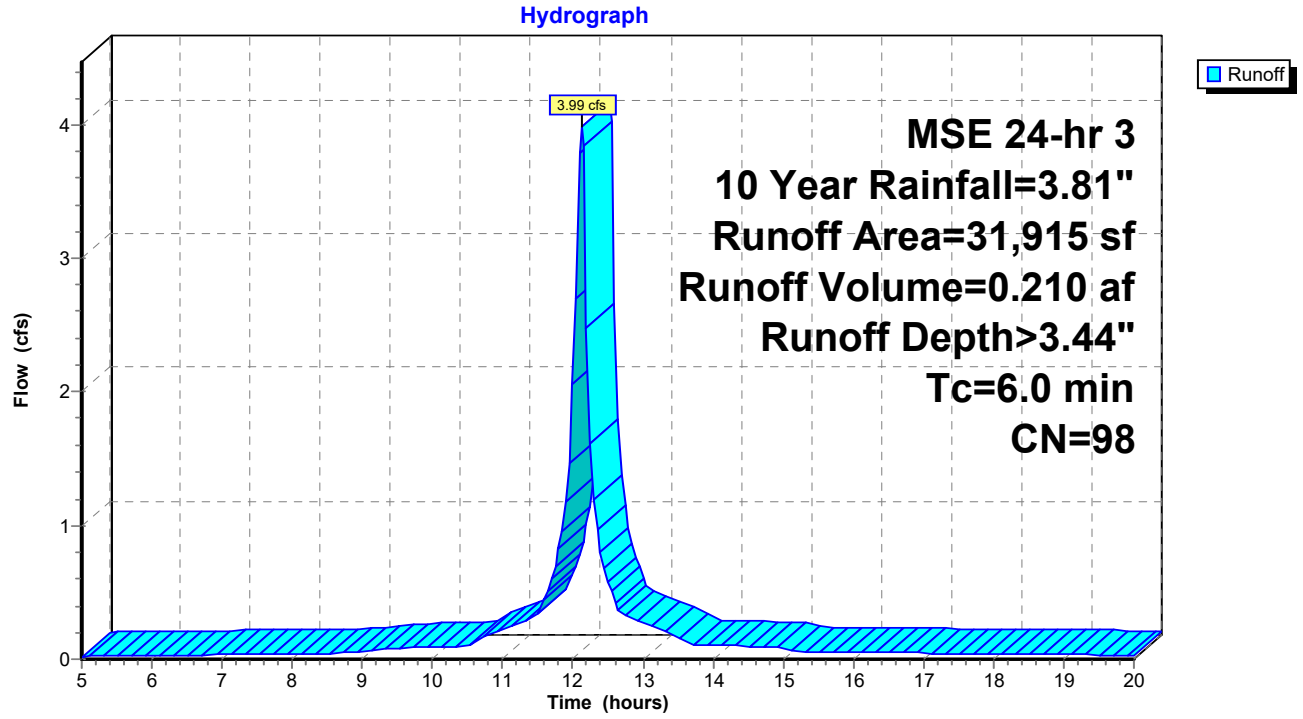
Runoff = 3.99 cfs @ 12.13 hrs, Volume= 0.210 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

Area (sf)	CN	Description
31,915	98	Roofs, HSG D
31,915		100.00% Impervious Area

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

Subcatchment 3S: Roof Area 3



Hydrograph for Subcatchment 3S: Roof Area 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.14	0.03	0.02
5.25	0.16	0.04	0.02
5.50	0.17	0.05	0.02
5.75	0.18	0.06	0.02
6.00	0.19	0.07	0.03
6.25	0.21	0.08	0.03
6.50	0.22	0.09	0.03
6.75	0.24	0.10	0.03
7.00	0.25	0.11	0.03
7.25	0.27	0.12	0.04
7.50	0.28	0.13	0.04
7.75	0.30	0.15	0.04
8.00	0.32	0.16	0.04
8.25	0.34	0.18	0.04
8.50	0.35	0.19	0.05
8.75	0.37	0.21	0.05
9.00	0.39	0.22	0.05
9.25	0.42	0.25	0.08
9.50	0.46	0.28	0.08
9.75	0.49	0.31	0.09
10.00	0.52	0.34	0.09
10.25	0.56	0.37	0.10
10.50	0.60	0.41	0.10
10.75	0.66	0.46	0.17
11.00	0.73	0.54	0.23
11.25	0.83	0.63	0.28
11.50	0.94	0.74	0.33
11.75	1.17	0.96	0.69
12.00	1.76	1.54	**2.06**
12.25	2.64	2.41	**1.62**
12.50	2.87	2.63	0.58
12.75	2.98	2.75	0.33
13.00	3.08	2.84	0.28
13.25	3.15	2.92	0.22
13.50	3.21	2.98	0.17
13.75	3.25	3.02	0.11
14.00	3.29	3.05	0.10
14.25	3.32	3.09	0.10
14.50	3.35	3.12	0.10
14.75	3.39	3.15	0.09
15.00	3.42	3.18	0.09
15.25	3.44	3.20	0.06
15.50	3.46	3.22	0.05
15.75	3.47	3.24	0.05
16.00	3.49	3.26	0.05
16.25	3.51	3.27	0.05
16.50	3.53	3.29	0.05
16.75	3.54	3.31	0.05
17.00	3.56	3.32	0.05
17.25	3.57	3.34	0.05
17.50	3.59	3.35	0.04
17.75	3.60	3.37	0.04
18.00	3.62	3.38	0.04
18.25	3.63	3.40	0.04
18.50	3.64	3.41	0.04
18.75	3.65	3.42	0.04
19.00	3.67	3.43	0.04
19.25	3.68	3.44	0.03
19.50	3.69	3.46	0.03
19.75	3.70	3.47	0.03
20.00	**3.71**	**3.48**	0.03

Summary for Subcatchment 4S: Watershed Area 1

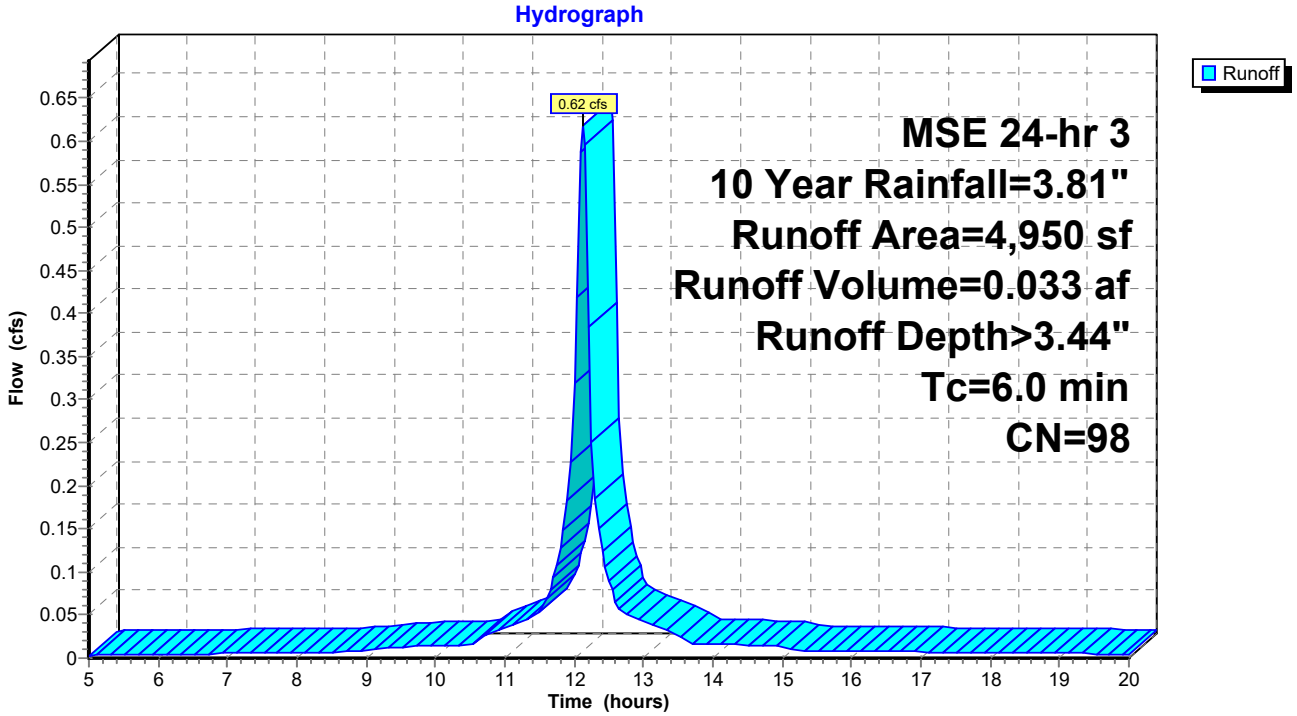
Runoff = 0.62 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

Area (sf)	CN	Description
4,950	98	Paved parking, HSG D
0	80	>75% Grass cover, Good, HSG D
4,950	98	Weighted Average
4,950		100.00% Impervious Area

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

Subcatchment 4S: Watershed Area 1



Hydrograph for Subcatchment 4S: Watershed Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.14	0.03	0.00
5.25	0.16	0.04	0.00
5.50	0.17	0.05	0.00
5.75	0.18	0.06	0.00
6.00	0.19	0.07	0.00
6.25	0.21	0.08	0.00
6.50	0.22	0.09	0.00
6.75	0.24	0.10	0.01
7.00	0.25	0.11	0.01
7.25	0.27	0.12	0.01
7.50	0.28	0.13	0.01
7.75	0.30	0.15	0.01
8.00	0.32	0.16	0.01
8.25	0.34	0.18	0.01
8.50	0.35	0.19	0.01
8.75	0.37	0.21	0.01
9.00	0.39	0.22	0.01
9.25	0.42	0.25	0.01
9.50	0.46	0.28	0.01
9.75	0.49	0.31	0.01
10.00	0.52	0.34	0.01
10.25	0.56	0.37	0.01
10.50	0.60	0.41	0.02
10.75	0.66	0.46	0.03
11.00	0.73	0.54	0.03
11.25	0.83	0.63	0.04
11.50	0.94	0.74	0.05
11.75	1.17	0.96	0.11
12.00	1.76	1.54	**0.32**
12.25	2.64	2.41	**0.25**
12.50	2.87	2.63	0.09
12.75	2.98	2.75	0.05
13.00	3.08	2.84	0.04
13.25	3.15	2.92	0.03
13.50	3.21	2.98	0.03
13.75	3.25	3.02	0.02
14.00	3.29	3.05	0.02
14.25	3.32	3.09	0.02
14.50	3.35	3.12	0.02
14.75	3.39	3.15	0.01
15.00	3.42	3.18	0.01
15.25	3.44	3.20	0.01
15.50	3.46	3.22	0.01
15.75	3.47	3.24	0.01
16.00	3.49	3.26	0.01
16.25	3.51	3.27	0.01
16.50	3.53	3.29	0.01
16.75	3.54	3.31	0.01
17.00	3.56	3.32	0.01
17.25	3.57	3.34	0.01
17.50	3.59	3.35	0.01
17.75	3.60	3.37	0.01
18.00	3.62	3.38	0.01
18.25	3.63	3.40	0.01
18.50	3.64	3.41	0.01
18.75	3.65	3.42	0.01
19.00	3.67	3.43	0.01
19.25	3.68	3.44	0.01
19.50	3.69	3.46	0.01
19.75	3.70	3.47	0.00
20.00	**3.71**	**3.48**	0.00

Summary for Subcatchment 5S: Offsite Area 1

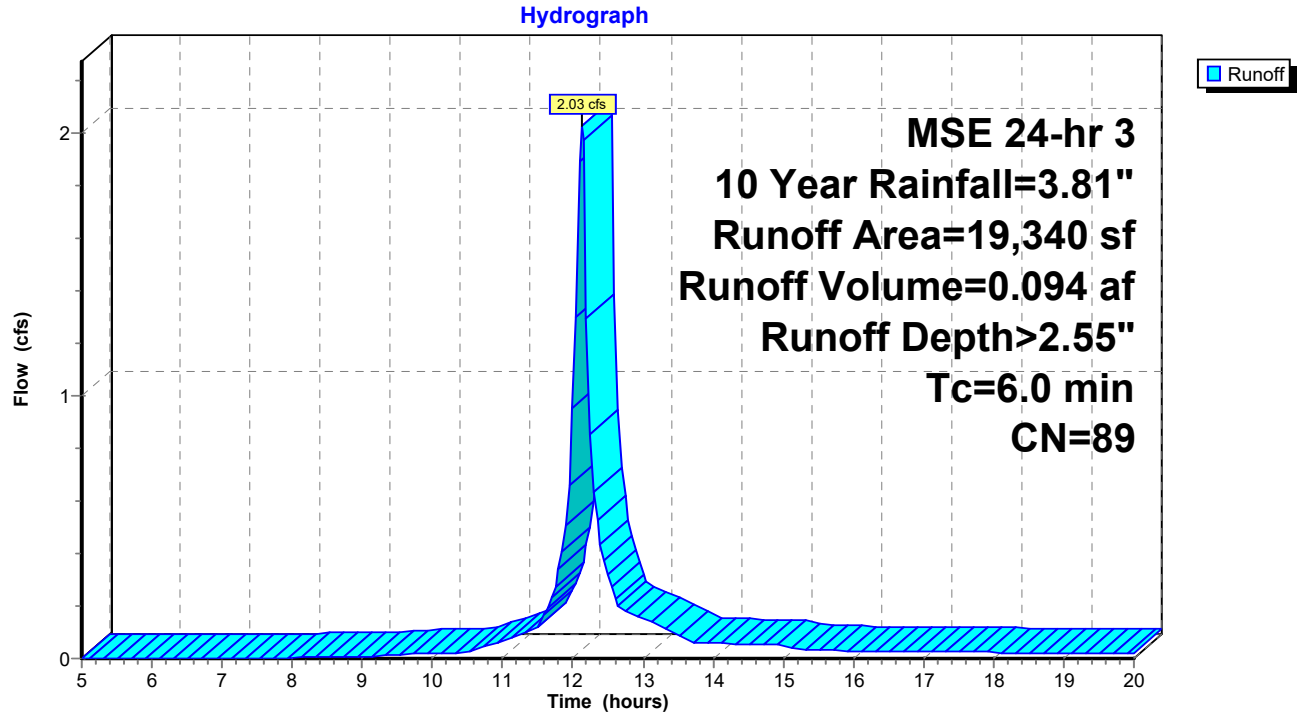
Runoff = 2.03 cfs @ 12.13 hrs, Volume= 0.094 af, Depth> 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

Area (sf)	CN	Description
9,160	98	Paved parking, HSG D
10,180	80	>75% Grass cover, Good, HSG D
19,340	89	Weighted Average
10,180		52.64% Pervious Area
9,160		47.36% Impervious Area

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

Subcatchment 5S: Offsite Area 1



Hydrograph for Subcatchment 5S: Offsite Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.14	0.00	0.00
5.25	0.16	0.00	0.00
5.50	0.17	0.00	0.00
5.75	0.18	0.00	0.00
6.00	0.19	0.00	0.00
6.25	0.21	0.00	0.00
6.50	0.22	0.00	0.00
6.75	0.24	0.00	0.00
7.00	0.25	0.00	0.00
7.25	0.27	0.00	0.00
7.50	0.28	0.00	0.00
7.75	0.30	0.00	0.00
8.00	0.32	0.00	0.00
8.25	0.34	0.01	0.00
8.50	0.35	0.01	0.00
8.75	0.37	0.01	0.01
9.00	0.39	0.02	0.01
9.25	0.42	0.02	0.01
9.50	0.46	0.03	0.01
9.75	0.49	0.04	0.02
10.00	0.52	0.05	0.02
10.25	0.56	0.06	0.02
10.50	0.60	0.08	0.03
10.75	0.66	0.10	0.05
11.00	0.73	0.14	0.07
11.25	0.83	0.19	0.09
11.50	0.94	0.25	0.12
11.75	1.17	0.40	0.28
12.00	1.76	0.84	**0.95**
12.25	2.64	1.58	**0.85**
12.50	2.87	1.78	0.32
12.75	2.98	1.88	0.18
13.00	3.08	1.97	0.15
13.25	3.15	2.04	0.12
13.50	3.21	2.09	0.09
13.75	3.25	2.13	0.06
14.00	3.29	2.16	0.06
14.25	3.32	2.19	0.06
14.50	3.35	2.22	0.05
14.75	3.39	2.25	0.05
15.00	3.42	2.28	0.05
15.25	3.44	2.30	0.03
15.50	3.46	2.32	0.03
15.75	3.47	2.33	0.03
16.00	3.49	2.35	0.03
16.25	3.51	2.36	0.03
16.50	3.53	2.38	0.03
16.75	3.54	2.40	0.03
17.00	3.56	2.41	0.03
17.25	3.57	2.42	0.03
17.50	3.59	2.44	0.02
17.75	3.60	2.45	0.02
18.00	3.62	2.46	0.02
18.25	3.63	2.48	0.02
18.50	3.64	2.49	0.02
18.75	3.65	2.50	0.02
19.00	3.67	2.51	0.02
19.25	3.68	2.52	0.02
19.50	3.69	2.53	0.02
19.75	3.70	2.54	0.02
20.00	**3.71**	**2.55**	0.02

Summary for Subcatchment 6S: Offsite Area 2

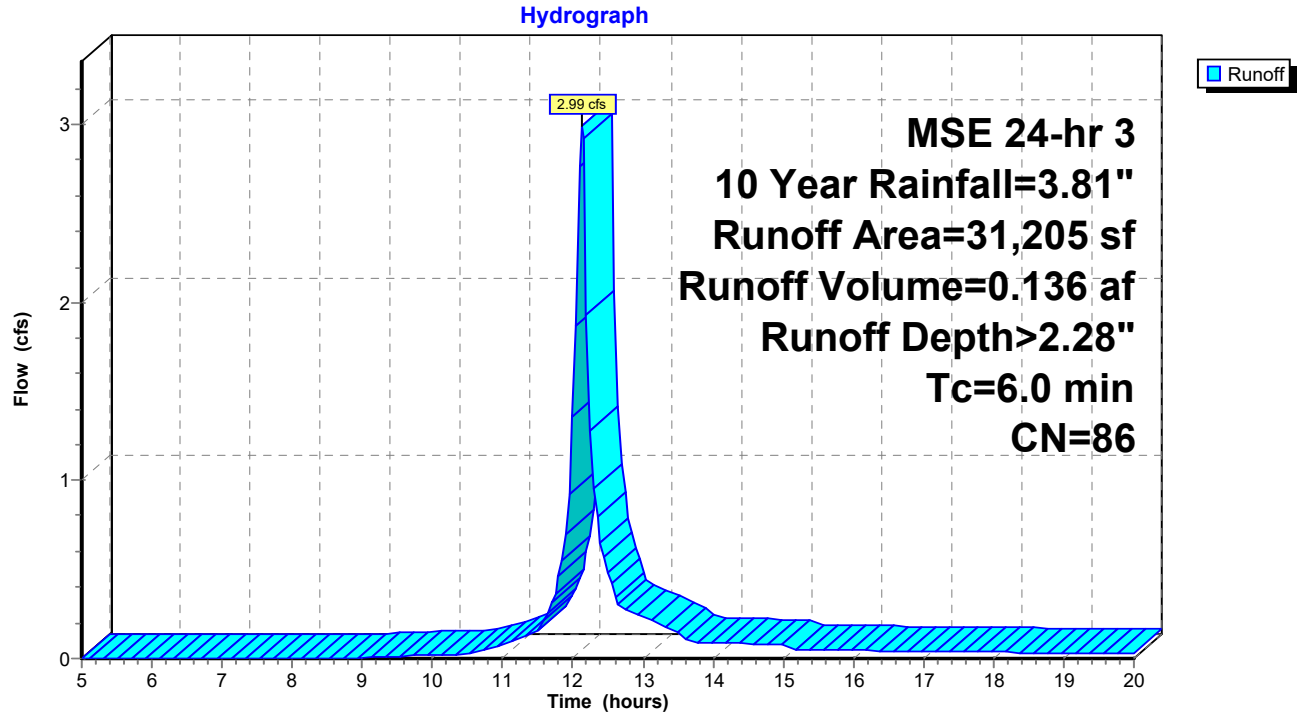
Runoff = 2.99 cfs @ 12.13 hrs, Volume= 0.136 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

Area (sf)	CN	Description
10,685	98	Paved parking, HSG D
20,520	80	>75% Grass cover, Good, HSG D
31,205	86	Weighted Average
20,520		65.76% Pervious Area
10,685		34.24% Impervious Area

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

Subcatchment 6S: Offsite Area 2



Hydrograph for Subcatchment 6S: Offsite Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.14	0.00	0.00
5.25	0.16	0.00	0.00
5.50	0.17	0.00	0.00
5.75	0.18	0.00	0.00
6.00	0.19	0.00	0.00
6.25	0.21	0.00	0.00
6.50	0.22	0.00	0.00
6.75	0.24	0.00	0.00
7.00	0.25	0.00	0.00
7.25	0.27	0.00	0.00
7.50	0.28	0.00	0.00
7.75	0.30	0.00	0.00
8.00	0.32	0.00	0.00
8.25	0.34	0.00	0.00
8.50	0.35	0.00	0.00
8.75	0.37	0.00	0.00
9.00	0.39	0.00	0.00
9.25	0.42	0.01	0.01
9.50	0.46	0.01	0.01
9.75	0.49	0.01	0.02
10.00	0.52	0.02	0.02
10.25	0.56	0.03	0.02
10.50	0.60	0.04	0.03
10.75	0.66	0.06	0.05
11.00	0.73	0.08	0.08
11.25	0.83	0.12	0.11
11.50	0.94	0.17	0.15
11.75	1.17	0.29	0.37
12.00	1.76	0.67	**1.35**
12.25	2.64	1.36	**1.28**
12.50	2.87	1.55	0.48
12.75	2.98	1.64	0.28
13.00	3.08	1.73	0.23
13.25	3.15	1.79	0.19
13.50	3.21	1.85	0.14
13.75	3.25	1.88	0.09
14.00	3.29	1.91	0.09
14.25	3.32	1.94	0.09
14.50	3.35	1.97	0.08
14.75	3.39	2.00	0.08
15.00	3.42	2.03	0.08
15.25	3.44	2.04	0.05
15.50	3.46	2.06	0.05
15.75	3.47	2.07	0.05
16.00	3.49	2.09	0.05
16.25	3.51	2.11	0.04
16.50	3.53	2.12	0.04
16.75	3.54	2.14	0.04
17.00	3.56	2.15	0.04
17.25	3.57	2.16	0.04
17.50	3.59	2.18	0.04
17.75	3.60	2.19	0.04
18.00	3.62	2.20	0.04
18.25	3.63	2.21	0.03
18.50	3.64	2.22	0.03
18.75	3.65	2.24	0.03
19.00	3.67	2.25	0.03
19.25	3.68	2.26	0.03
19.50	3.69	2.27	0.03
19.75	3.70	2.28	0.03
20.00	**3.71**	**2.29**	0.03

Summary for Subcatchment 7S: Watershed Area 2

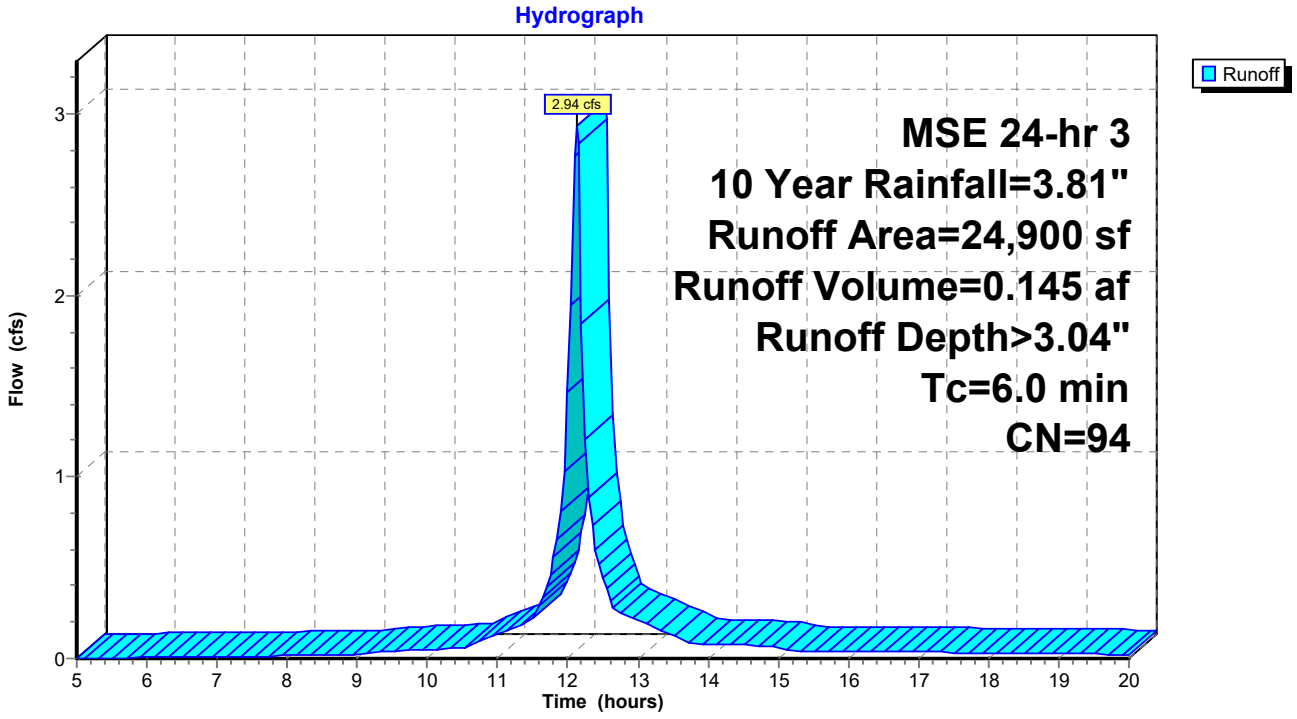
Runoff = 2.94 cfs @ 12.13 hrs, Volume= 0.145 af, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

Area (sf)	CN	Description
19,440	98	Paved parking, HSG D
5,460	80	>75% Grass cover, Good, HSG D
24,900	94	Weighted Average
5,460		21.93% Pervious Area
19,440		78.07% Impervious Area

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

Subcatchment 7S: Watershed Area 2



Hydrograph for Subcatchment 7S: Watershed Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.14	0.00	0.00
5.25	0.16	0.00	0.00
5.50	0.17	0.00	0.00
5.75	0.18	0.00	0.00
6.00	0.19	0.01	0.01
6.25	0.21	0.01	0.01
6.50	0.22	0.01	0.01
6.75	0.24	0.02	0.01
7.00	0.25	0.02	0.01
7.25	0.27	0.03	0.01
7.50	0.28	0.03	0.01
7.75	0.30	0.04	0.01
8.00	0.32	0.04	0.02
8.25	0.34	0.05	0.02
8.50	0.35	0.06	0.02
8.75	0.37	0.07	0.02
9.00	0.39	0.08	0.02
9.25	0.42	0.09	0.04
9.50	0.46	0.11	0.04
9.75	0.49	0.13	0.04
10.00	0.52	0.15	0.05
10.25	0.56	0.17	0.05
10.50	0.60	0.20	0.06
10.75	0.66	0.24	0.10
11.00	0.73	0.30	0.13
11.25	0.83	0.37	0.17
11.50	0.94	0.46	0.21
11.75	1.17	0.65	0.46
12.00	1.76	1.18	**1.47**
12.25	2.64	2.00	**1.21**
12.50	2.87	2.22	0.44
12.75	2.98	2.33	0.25
13.00	3.08	2.42	0.21
13.25	3.15	2.50	0.17
13.50	3.21	2.56	0.13
13.75	3.25	2.59	0.08
14.00	3.29	2.63	0.08
14.25	3.32	2.66	0.08
14.50	3.35	2.69	0.07
14.75	3.39	2.72	0.07
15.00	3.42	2.76	0.07
15.25	3.44	2.77	0.04
15.50	3.46	2.79	0.04
15.75	3.47	2.81	0.04
16.00	3.49	2.83	0.04
16.25	3.51	2.84	0.04
16.50	3.53	2.86	0.04
16.75	3.54	2.88	0.04
17.00	3.56	2.89	0.04
17.25	3.57	2.91	0.03
17.50	3.59	2.92	0.03
17.75	3.60	2.94	0.03
18.00	3.62	2.95	0.03
18.25	3.63	2.96	0.03
18.50	3.64	2.97	0.03
18.75	3.65	2.99	0.03
19.00	3.67	3.00	0.03
19.25	3.68	3.01	0.03
19.50	3.69	3.02	0.02
19.75	3.70	3.03	0.02
20.00	**3.71**	**3.04**	0.02

Summary for Pond 10P: Porous Pavement

Inflow Area = 0.572 ac, 78.07% Impervious, Inflow Depth > 3.04" for 10 Year event
Inflow = 2.94 cfs @ 12.13 hrs, Volume= 0.145 af
Outflow = 0.94 cfs @ 12.30 hrs, Volume= 0.141 af, Atten= 68%, Lag= 10.2 min
Primary = 0.94 cfs @ 12.30 hrs, Volume= 0.141 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 29.58' @ 12.30 hrs Surf.Area= 4,500 sf Storage= 2,232 cf

Plug-Flow detention time= 45.8 min calculated for 0.141 af (97% of inflow)
Center-of-Mass det. time= 35.1 min (788.7 - 753.6)

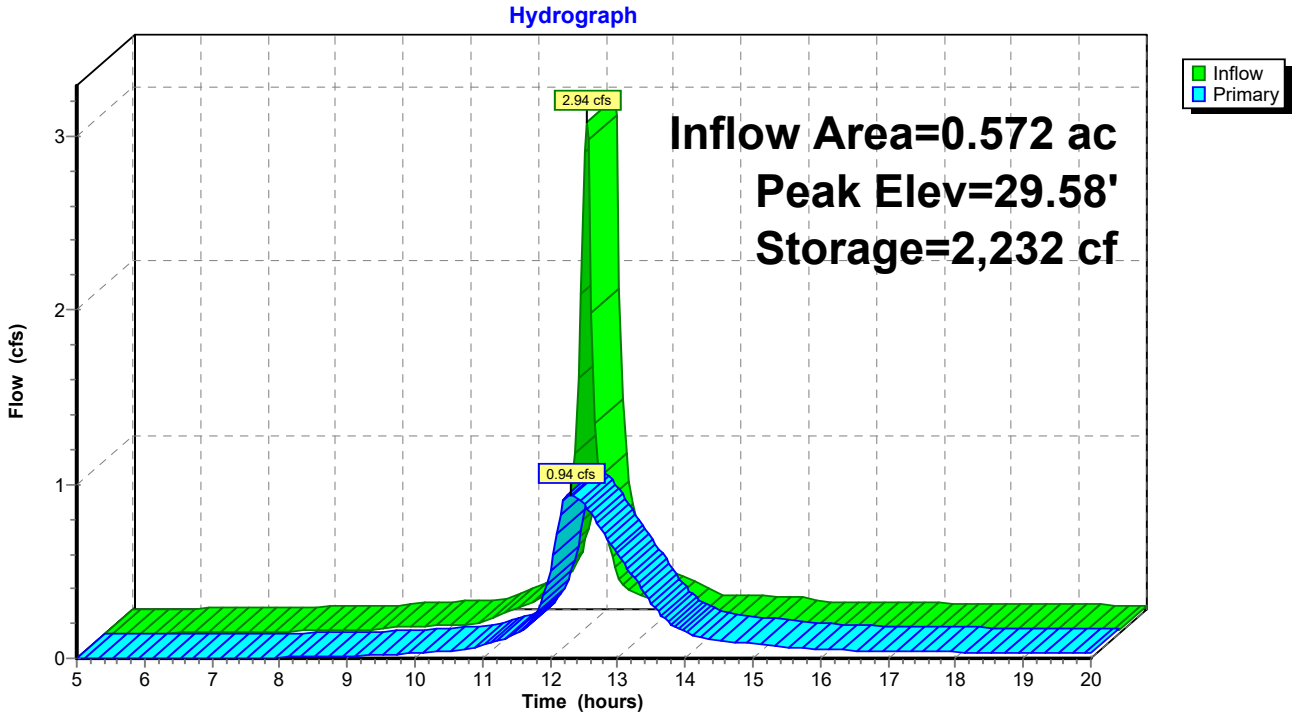
Volume	Invert	Avail.Storage	Storage Description
#1	28.34'	3,971 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.34	4,500	0.0	0	0
30.34	4,500	40.0	3,600	3,600
30.67	4,500	25.0	371	3,971

Device	Routing	Invert	Outlet Devices
#1	Primary	28.34'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.94 cfs @ 12.30 hrs HW=29.58' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.94 cfs @ 4.79 fps)

Pond 10P: Porous Pavement



Hydrograph for Pond 10P: Porous Pavement

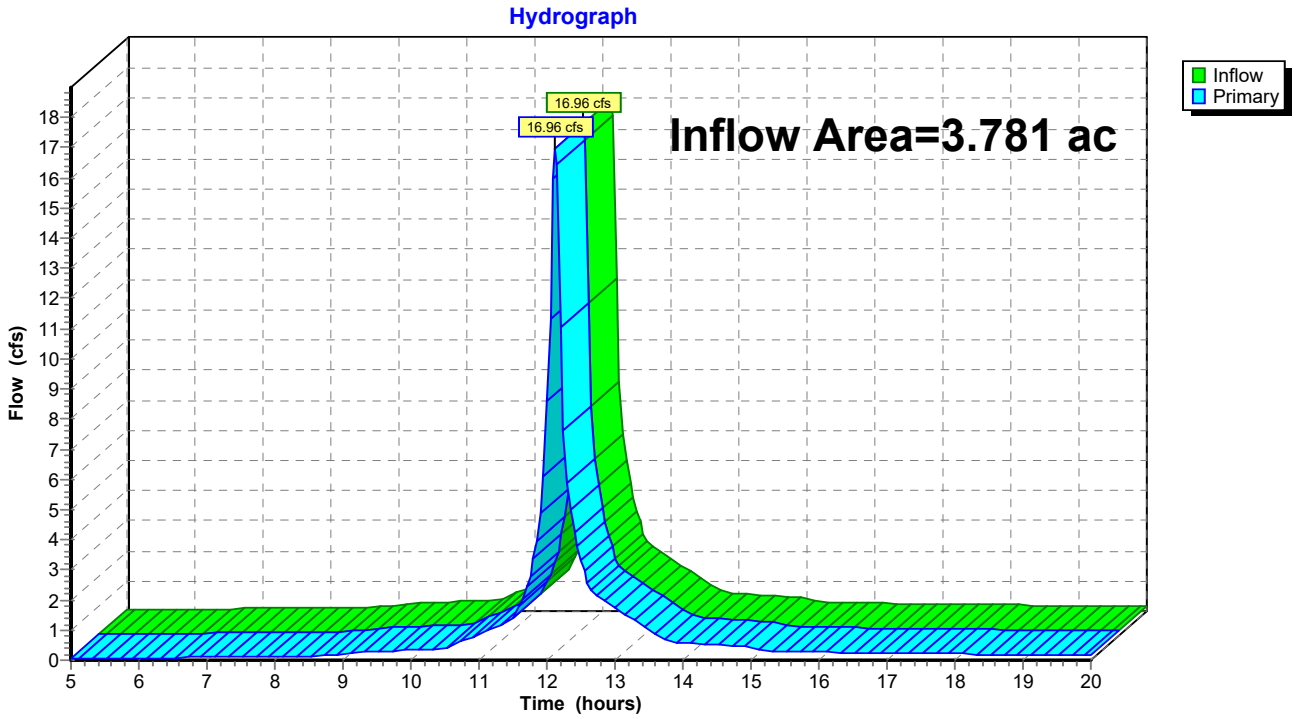
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	28.34	0.00
5.50	0.00	3	28.34	0.00
6.00	0.01	10	28.35	0.00
6.50	0.01	21	28.35	0.00
7.00	0.01	35	28.36	0.00
7.50	0.01	52	28.37	0.00
8.00	0.02	71	28.38	0.01
8.50	0.02	91	28.39	0.01
9.00	0.02	109	28.40	0.01
9.50	0.04	145	28.42	0.02
10.00	0.05	181	28.44	0.03
10.50	0.06	210	28.46	0.04
11.00	0.13	288	28.50	0.07
11.50	0.21	410	28.57	0.14
12.00	**1.47**	**955**	**28.87**	**0.50**
12.50	**0.44**	**2,023**	**29.46**	**0.88**
13.00	0.21	1,173	28.99	0.60
13.50	0.13	657	28.70	0.32
14.00	0.08	425	28.58	0.15
14.50	0.07	343	28.53	0.10
15.00	0.07	307	28.51	0.08
15.50	0.04	262	28.49	0.06
16.00	0.04	235	28.47	0.05
16.50	0.04	220	28.46	0.04
17.00	0.04	210	28.46	0.04
17.50	0.03	201	28.45	0.04
18.00	0.03	194	28.45	0.04
18.50	0.03	187	28.44	0.03
19.00	0.03	181	28.44	0.03
19.50	0.02	174	28.44	0.03
20.00	0.02	168	28.43	0.03

Summary for Link 1L: Proposed Total

Inflow Area = 3.781 ac, 78.04% Impervious, Inflow Depth > 3.04" for 10 Year event
Inflow = 16.96 cfs @ 12.13 hrs, Volume= 0.959 af
Primary = 16.96 cfs @ 12.13 hrs, Volume= 0.959 af, Atten= 0%, Lag= 0.0 min

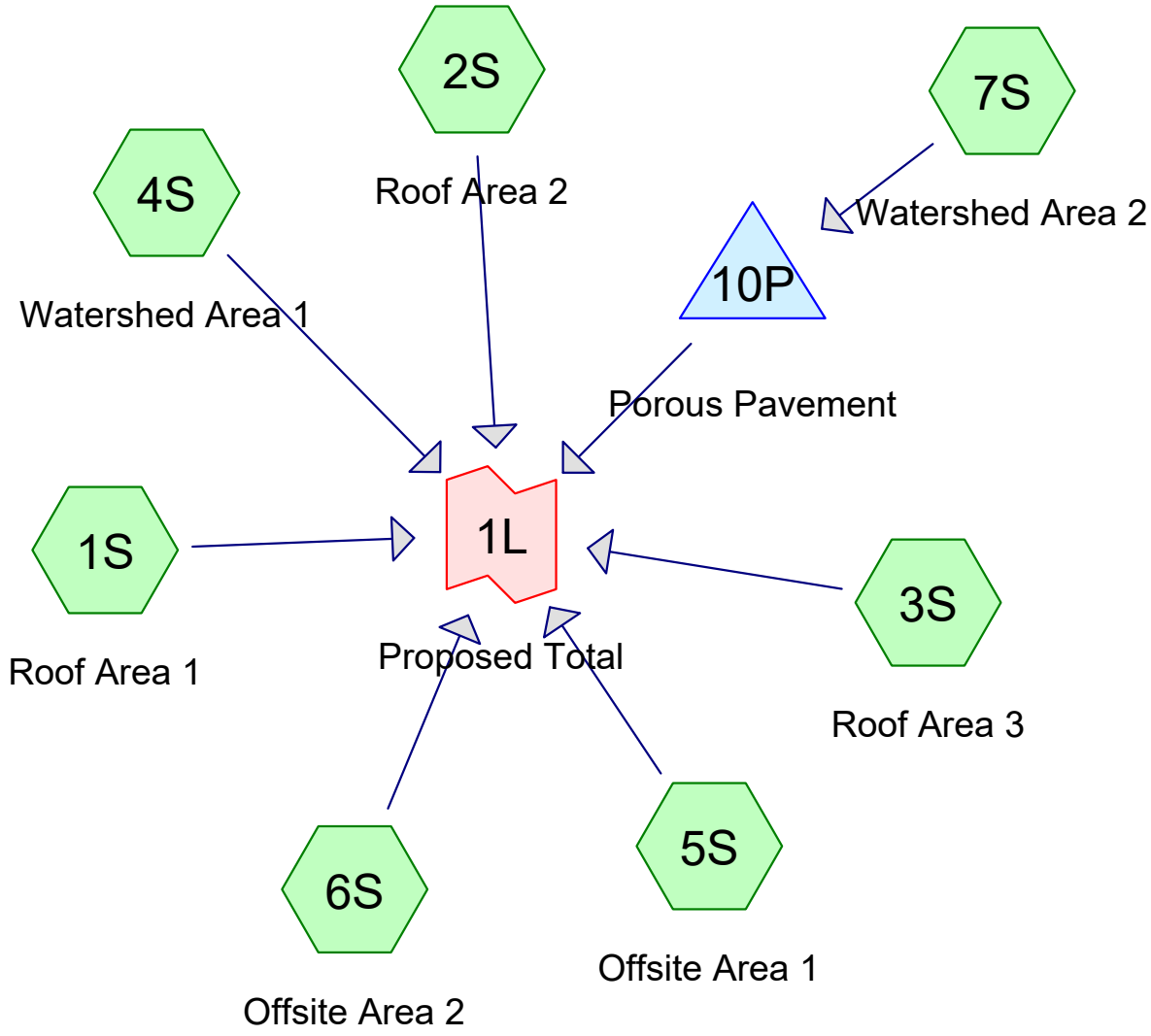
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 1L: Proposed Total



Hydrograph for Link 1L: Proposed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.05	**0.00**	0.05
5.25	0.06	0.00	0.06
5.50	0.06	0.00	0.06
5.75	0.07	0.00	0.07
6.00	0.07	0.00	0.07
6.25	0.08	0.00	0.08
6.50	0.09	0.00	0.09
6.75	0.09	0.00	0.09
7.00	0.10	0.00	0.10
7.25	0.10	0.00	0.10
7.50	0.11	0.00	0.11
7.75	0.12	0.00	0.12
8.00	0.12	0.00	0.12
8.25	0.13	0.00	0.13
8.50	0.14	0.00	0.14
8.75	0.15	0.00	0.15
9.00	0.16	0.00	0.16
9.25	0.26	0.00	0.26
9.50	0.28	0.00	0.28
9.75	0.31	0.00	0.31
10.00	0.33	0.00	0.33
10.25	0.35	0.00	0.35
10.50	0.37	0.00	0.37
10.75	0.63	0.00	0.63
11.00	0.85	0.00	0.85
11.25	1.08	0.00	1.08
11.50	1.35	0.00	1.35
11.75	2.80	0.00	2.80
12.00	**8.58**	0.00	**8.58**
12.25	**7.60**	0.00	**7.60**
12.50	3.31	0.00	3.31
12.75	2.13	0.00	2.13
13.00	1.76	0.00	1.76
13.25	1.40	0.00	1.40
13.50	1.03	0.00	1.03
13.75	0.66	0.00	0.66
14.00	0.59	0.00	0.59
14.25	0.55	0.00	0.55
14.50	0.51	0.00	0.51
14.75	0.49	0.00	0.49
15.00	0.47	0.00	0.47
15.25	0.31	0.00	0.31
15.50	0.29	0.00	0.29
15.75	0.28	0.00	0.28
16.00	0.27	0.00	0.27
16.25	0.26	0.00	0.26
16.50	0.25	0.00	0.25
16.75	0.24	0.00	0.24
17.00	0.24	0.00	0.24
17.25	0.23	0.00	0.23
17.50	0.22	0.00	0.22
17.75	0.22	0.00	0.22
18.00	0.21	0.00	0.21
18.25	0.20	0.00	0.20
18.50	0.20	0.00	0.20
18.75	0.19	0.00	0.19
19.00	0.18	0.00	0.18
19.25	0.17	0.00	0.17
19.50	0.17	0.00	0.17
19.75	0.16	0.00	0.16
20.00	0.15	0.00	0.15



Subcat Reach Pond Link

Routing Diagram for 19754 HydroCAD - Proposed
Prepared by The Sigma Group, Inc, Printed 7/29/2021

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	100 Year	MSE 24-hr	3	Default	24.00	1	6.18	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.830	80	>75% Grass cover, Good, HSG D (5S, 6S, 7S)
1.015	98	Paved parking, HSG D (4S, 5S, 6S, 7S)
1.935	98	Roofs, HSG D (1S, 2S, 3S)
3.781	**94**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.781	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	Other	
3.781		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.830	0.000	0.830	>75% Grass cover, Good	5S, 6S, 7S
0.000	0.000	0.000	1.015	0.000	1.015	Paved parking	4S, 5S, 6S, 7S
0.000	0.000	0.000	1.935	0.000	1.935	Roofs	1S, 2S, 3S
0.000	**0.000**	**0.000**	**3.781**	**0.000**	**3.781**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Roof Area 1 Runoff Area=25,800 sf 100.00% Impervious Runoff Depth>5.69"
Tc=6.0 min CN=98 Runoff=5.26 cfs 0.281 af

Subcatchment2S: Roof Area 2 Runoff Area=26,590 sf 100.00% Impervious Runoff Depth>5.69"
Tc=6.0 min CN=98 Runoff=5.42 cfs 0.289 af

Subcatchment3S: Roof Area 3 Runoff Area=31,915 sf 100.00% Impervious Runoff Depth>5.69"
Tc=6.0 min CN=98 Runoff=6.51 cfs 0.347 af

Subcatchment4S: Watershed Area 1 Runoff Area=4,950 sf 100.00% Impervious Runoff Depth>5.69"
Tc=6.0 min CN=98 Runoff=1.01 cfs 0.054 af

Subcatchment5S: Offsite Area 1 Runoff Area=19,340 sf 47.36% Impervious Runoff Depth>4.75"
Tc=6.0 min CN=89 Runoff=3.62 cfs 0.176 af

Subcatchment6S: Offsite Area 2 Runoff Area=31,205 sf 34.24% Impervious Runoff Depth>4.42"
Tc=6.0 min CN=86 Runoff=5.58 cfs 0.264 af

Subcatchment7S: Watershed Area 2 Runoff Area=24,900 sf 78.07% Impervious Runoff Depth>5.30"
Tc=6.0 min CN=94 Runoff=4.95 cfs 0.252 af

Pond 10P: Porous Pavement Peak Elev=30.66' Storage=3,964 cf Inflow=4.95 cfs 0.252 af
Outflow=1.36 cfs 0.247 af

Link 1L: Proposed Total Inflow=28.50 cfs 1.659 af
Primary=28.50 cfs 1.659 af

Total Runoff Area = 3.781 ac Runoff Volume = 1.664 af Average Runoff Depth = 5.28"
21.96% Pervious = 0.830 ac 78.04% Impervious = 2.951 ac

Summary for Subcatchment 1S: Roof Area 1

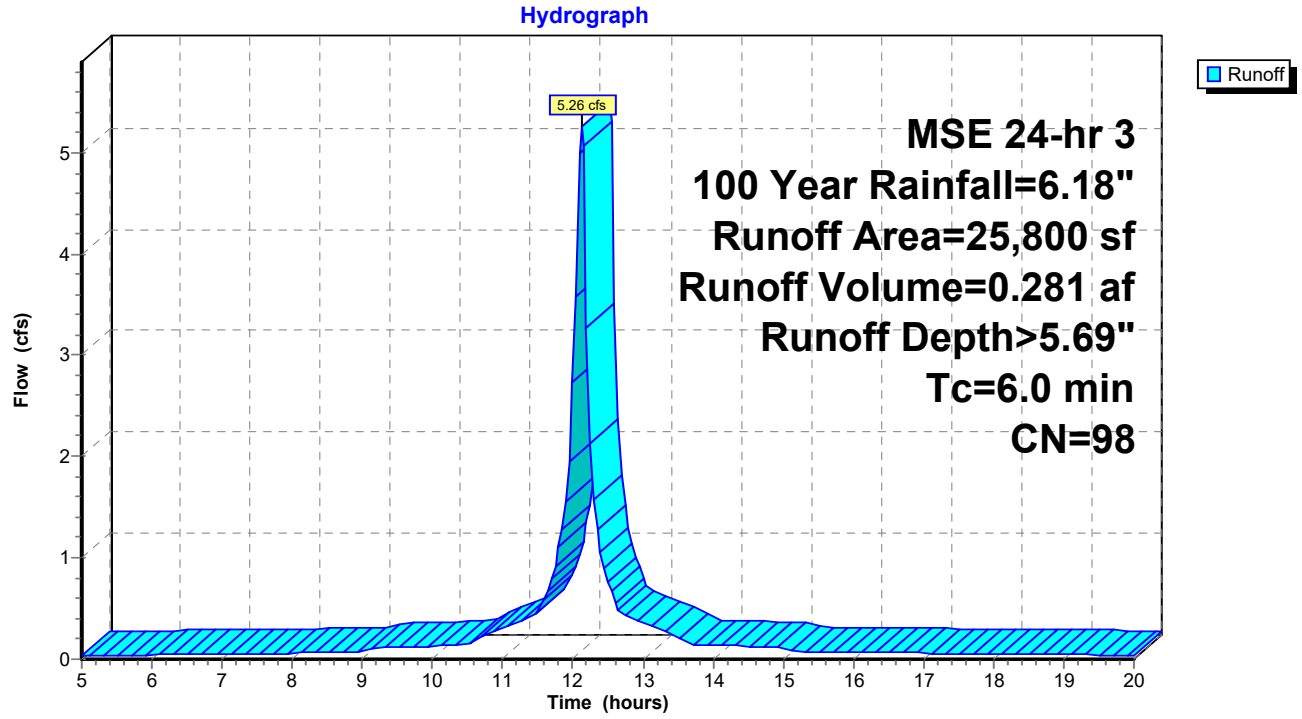
Runoff = 5.26 cfs @ 12.13 hrs, Volume= 0.281 af, Depth> 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

Area (sf)	CN	Description
25,800	98	Roofs, HSG D
25,800		100.00% Impervious Area

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

Subcatchment 1S: Roof Area 1



Hydrograph for Subcatchment 1S: Roof Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.23	0.09	0.03
5.25	0.25	0.11	0.04
5.50	0.27	0.12	0.04
5.75	0.29	0.14	0.04
6.00	0.31	0.16	0.04
6.25	0.34	0.18	0.04
6.50	0.36	0.20	0.05
6.75	0.39	0.22	0.05
7.00	0.41	0.24	0.05
7.25	0.44	0.26	0.05
7.50	0.46	0.28	0.06
7.75	0.49	0.31	0.06
8.00	0.52	0.33	0.06
8.25	0.55	0.36	0.06
8.50	0.58	0.39	0.07
8.75	0.61	0.42	0.07
9.00	0.64	0.44	0.07
9.25	0.69	0.49	0.11
9.50	0.74	0.54	0.12
9.75	0.79	0.59	0.12
10.00	0.85	0.65	0.13
10.25	0.91	0.70	0.13
10.50	0.97	0.76	0.14
10.75	1.06	0.85	0.23
11.00	1.19	0.98	0.31
11.25	1.35	1.13	0.37
11.50	1.53	1.31	0.45
11.75	1.90	1.68	0.92
12.00	2.86	2.63	**2.73**
12.25	4.28	4.04	**2.13**
12.50	4.65	4.41	0.77
12.75	4.83	4.60	0.44
13.00	4.99	4.75	0.36
13.25	5.12	4.88	0.29
13.50	5.21	4.98	0.22
13.75	5.27	5.04	0.14
14.00	5.33	5.09	0.14
14.25	5.39	5.15	0.13
14.50	5.44	5.20	0.13
14.75	5.49	5.26	0.12
15.00	5.54	5.31	0.12
15.25	5.57	5.34	0.07
15.50	5.60	5.37	0.07
15.75	5.63	5.40	0.07
16.00	5.66	5.42	0.07
16.25	5.69	5.45	0.07
16.50	5.72	5.48	0.06
16.75	5.74	5.51	0.06
17.00	5.77	5.53	0.06
17.25	5.79	5.56	0.06
17.50	5.82	5.58	0.06
17.75	5.84	5.60	0.06
18.00	5.87	5.63	0.05
18.25	5.89	5.65	0.05
18.50	5.91	5.67	0.05
18.75	5.93	5.69	0.05
19.00	5.95	5.71	0.05
19.25	5.97	5.73	0.04
19.50	5.98	5.75	0.04
19.75	6.00	5.76	0.04
20.00	**6.02**	**5.78**	0.04

Summary for Subcatchment 2S: Roof Area 2

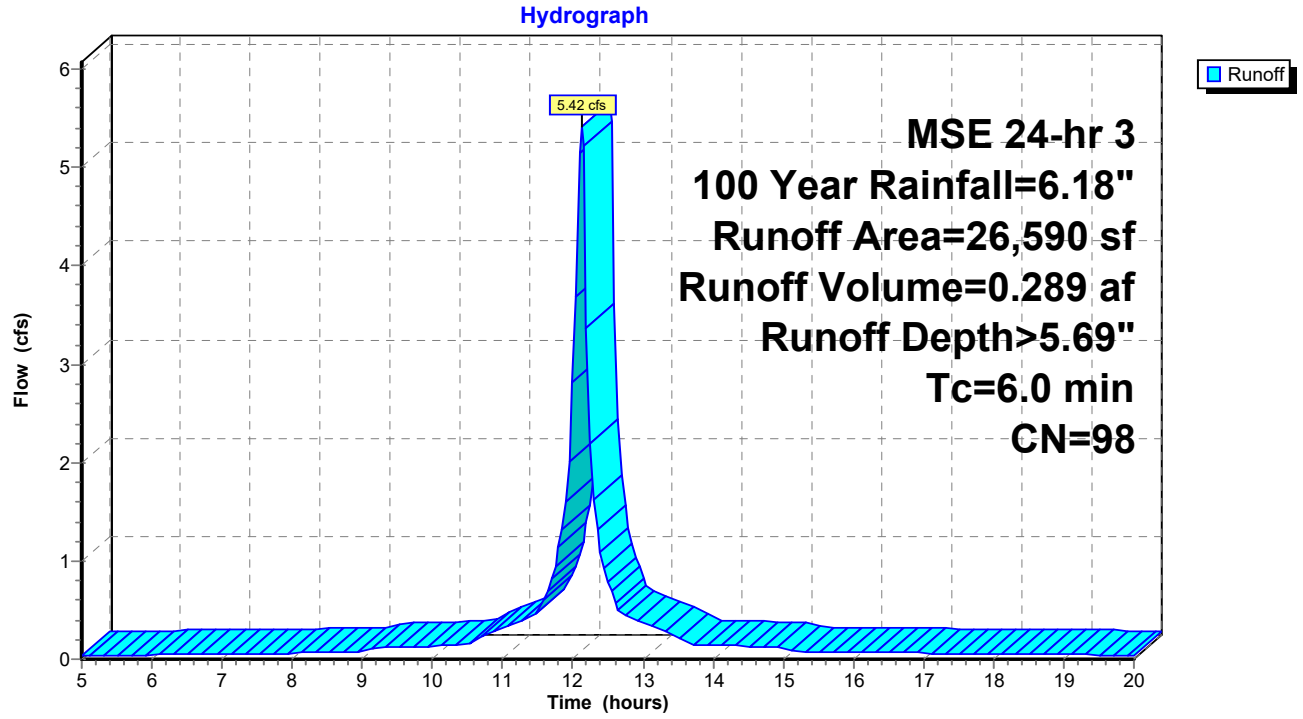
Runoff = 5.42 cfs @ 12.13 hrs, Volume= 0.289 af, Depth> 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

Area (sf)	CN	Description
26,590	98	Roofs, HSG D
26,590		100.00% Impervious Area

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

Subcatchment 2S: Roof Area 2



Hydrograph for Subcatchment 2S: Roof Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.23	0.09	0.03
5.25	0.25	0.11	0.04
5.50	0.27	0.12	0.04
5.75	0.29	0.14	0.04
6.00	0.31	0.16	0.04
6.25	0.34	0.18	0.05
6.50	0.36	0.20	0.05
6.75	0.39	0.22	0.05
7.00	0.41	0.24	0.05
7.25	0.44	0.26	0.06
7.50	0.46	0.28	0.06
7.75	0.49	0.31	0.06
8.00	0.52	0.33	0.06
8.25	0.55	0.36	0.06
8.50	0.58	0.39	0.07
8.75	0.61	0.42	0.07
9.00	0.64	0.44	0.07
9.25	0.69	0.49	0.12
9.50	0.74	0.54	0.12
9.75	0.79	0.59	0.13
10.00	0.85	0.65	0.13
10.25	0.91	0.70	0.14
10.50	0.97	0.76	0.14
10.75	1.06	0.85	0.24
11.00	1.19	0.98	0.31
11.25	1.35	1.13	0.39
11.50	1.53	1.31	0.46
11.75	1.90	1.68	0.95
12.00	2.86	2.63	**2.81**
12.25	4.28	4.04	**2.19**
12.50	4.65	4.41	0.79
12.75	4.83	4.60	0.45
13.00	4.99	4.75	0.37
13.25	5.12	4.88	0.30
13.50	5.21	4.98	0.23
13.75	5.27	5.04	0.15
14.00	5.33	5.09	0.14
14.25	5.39	5.15	0.14
14.50	5.44	5.20	0.13
14.75	5.49	5.26	0.13
15.00	5.54	5.31	0.12
15.25	5.57	5.34	0.08
15.50	5.60	5.37	0.07
15.75	5.63	5.40	0.07
16.00	5.66	5.42	0.07
16.25	5.69	5.45	0.07
16.50	5.72	5.48	0.07
16.75	5.74	5.51	0.06
17.00	5.77	5.53	0.06
17.25	5.79	5.56	0.06
17.50	5.82	5.58	0.06
17.75	5.84	5.60	0.06
18.00	5.87	5.63	0.06
18.25	5.89	5.65	0.05
18.50	5.91	5.67	0.05
18.75	5.93	5.69	0.05
19.00	5.95	5.71	0.05
19.25	5.97	5.73	0.05
19.50	5.98	5.75	0.04
19.75	6.00	5.76	0.04
20.00	**6.02**	**5.78**	0.04

Summary for Subcatchment 3S: Roof Area 3

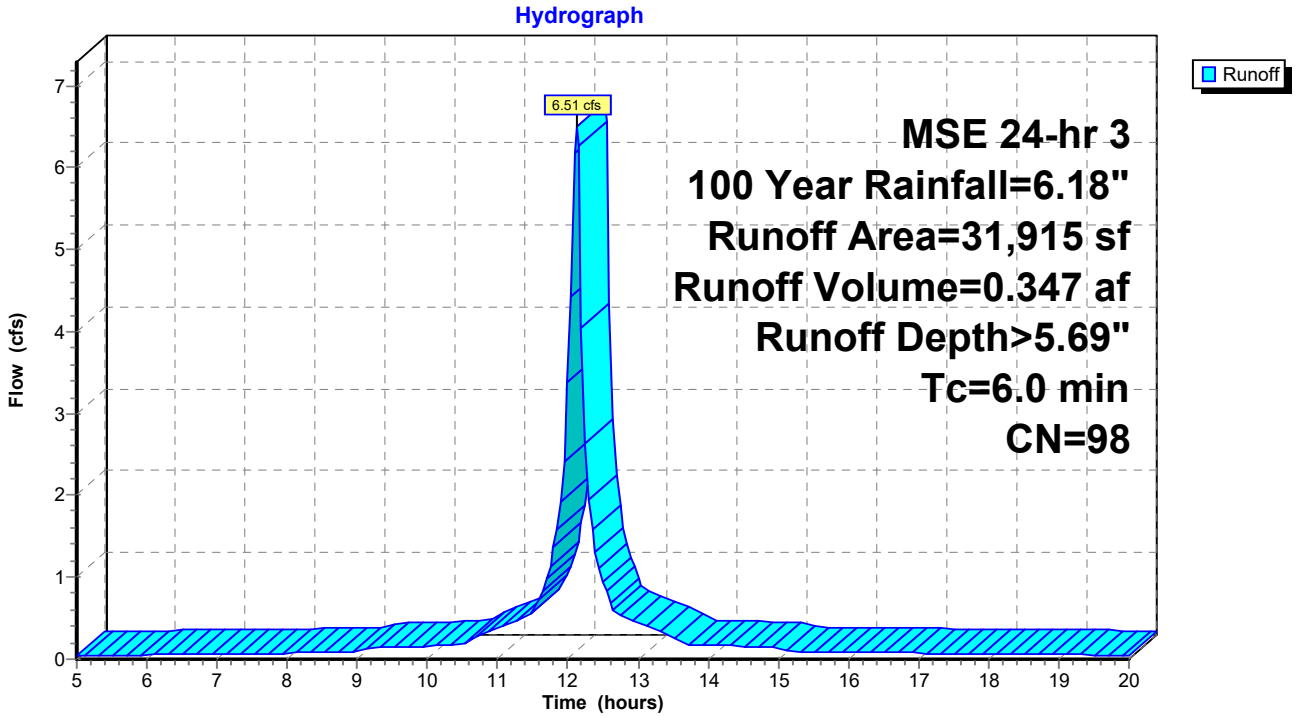
Runoff = 6.51 cfs @ 12.13 hrs, Volume= 0.347 af, Depth> 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

Area (sf)	CN	Description
31,915	98	Roofs, HSG D
31,915		100.00% Impervious Area

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

Subcatchment 3S: Roof Area 3



Hydrograph for Subcatchment 3S: Roof Area 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.23	0.09	0.04
5.25	0.25	0.11	0.04
5.50	0.27	0.12	0.05
5.75	0.29	0.14	0.05
6.00	0.31	0.16	0.05
6.25	0.34	0.18	0.06
6.50	0.36	0.20	0.06
6.75	0.39	0.22	0.06
7.00	0.41	0.24	0.06
7.25	0.44	0.26	0.07
7.50	0.46	0.28	0.07
7.75	0.49	0.31	0.07
8.00	0.52	0.33	0.08
8.25	0.55	0.36	0.08
8.50	0.58	0.39	0.08
8.75	0.61	0.42	0.08
9.00	0.64	0.44	0.09
9.25	0.69	0.49	0.14
9.50	0.74	0.54	0.15
9.75	0.79	0.59	0.15
10.00	0.85	0.65	0.16
10.25	0.91	0.70	0.16
10.50	0.97	0.76	0.17
10.75	1.06	0.85	0.29
11.00	1.19	0.98	0.38
11.25	1.35	1.13	0.46
11.50	1.53	1.31	0.55
11.75	1.90	1.68	1.14
12.00	2.86	2.63	**3.38**
12.25	4.28	4.04	**2.63**
12.50	4.65	4.41	0.95
12.75	4.83	4.60	0.54
13.00	4.99	4.75	0.45
13.25	5.12	4.88	0.36
13.50	5.21	4.98	0.28
13.75	5.27	5.04	0.17
14.00	5.33	5.09	0.17
14.25	5.39	5.15	0.16
14.50	5.44	5.20	0.16
14.75	5.49	5.26	0.15
15.00	5.54	5.31	0.15
15.25	5.57	5.34	0.09
15.50	5.60	5.37	0.09
15.75	5.63	5.40	0.09
16.00	5.66	5.42	0.08
16.25	5.69	5.45	0.08
16.50	5.72	5.48	0.08
16.75	5.74	5.51	0.08
17.00	5.77	5.53	0.08
17.25	5.79	5.56	0.07
17.50	5.82	5.58	0.07
17.75	5.84	5.60	0.07
18.00	5.87	5.63	0.07
18.25	5.89	5.65	0.06
18.50	5.91	5.67	0.06
18.75	5.93	5.69	0.06
19.00	5.95	5.71	0.06
19.25	5.97	5.73	0.06
19.50	5.98	5.75	0.05
19.75	6.00	5.76	0.05
20.00	**6.02**	**5.78**	0.05

Summary for Subcatchment 4S: Watershed Area 1

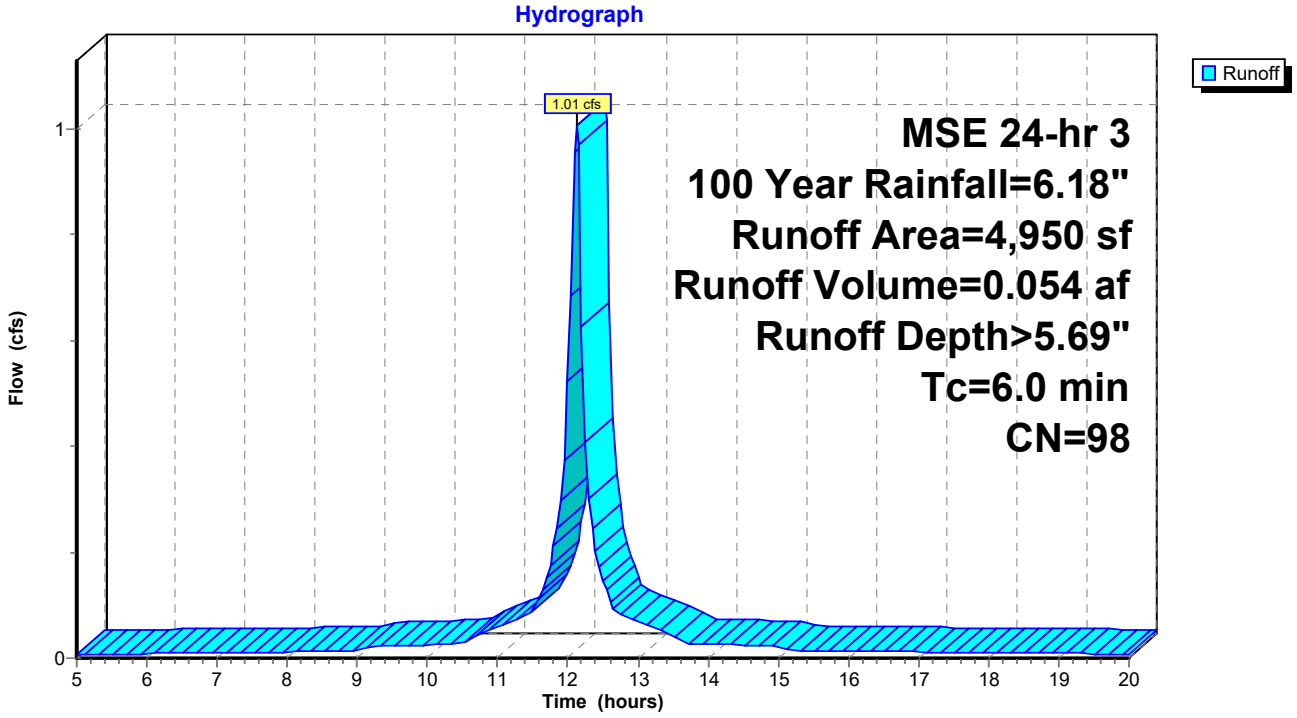
Runoff = 1.01 cfs @ 12.13 hrs, Volume= 0.054 af, Depth> 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

Area (sf)	CN	Description
4,950	98	Paved parking, HSG D
0	80	>75% Grass cover, Good, HSG D
4,950	98	Weighted Average
4,950		100.00% Impervious Area

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

Subcatchment 4S: Watershed Area 1



Hydrograph for Subcatchment 4S: Watershed Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.23	0.09	0.01
5.25	0.25	0.11	0.01
5.50	0.27	0.12	0.01
5.75	0.29	0.14	0.01
6.00	0.31	0.16	0.01
6.25	0.34	0.18	0.01
6.50	0.36	0.20	0.01
6.75	0.39	0.22	0.01
7.00	0.41	0.24	0.01
7.25	0.44	0.26	0.01
7.50	0.46	0.28	0.01
7.75	0.49	0.31	0.01
8.00	0.52	0.33	0.01
8.25	0.55	0.36	0.01
8.50	0.58	0.39	0.01
8.75	0.61	0.42	0.01
9.00	0.64	0.44	0.01
9.25	0.69	0.49	0.02
9.50	0.74	0.54	0.02
9.75	0.79	0.59	0.02
10.00	0.85	0.65	0.02
10.25	0.91	0.70	0.03
10.50	0.97	0.76	0.03
10.75	1.06	0.85	0.04
11.00	1.19	0.98	0.06
11.25	1.35	1.13	0.07
11.50	1.53	1.31	0.09
11.75	1.90	1.68	0.18
12.00	2.86	2.63	**0.52**
12.25	4.28	4.04	**0.41**
12.50	4.65	4.41	0.15
12.75	4.83	4.60	0.08
13.00	4.99	4.75	0.07
13.25	5.12	4.88	0.06
13.50	5.21	4.98	0.04
13.75	5.27	5.04	0.03
14.00	5.33	5.09	0.03
14.25	5.39	5.15	0.03
14.50	5.44	5.20	0.02
14.75	5.49	5.26	0.02
15.00	5.54	5.31	0.02
15.25	5.57	5.34	0.01
15.50	5.60	5.37	0.01
15.75	5.63	5.40	0.01
16.00	5.66	5.42	0.01
16.25	5.69	5.45	0.01
16.50	5.72	5.48	0.01
16.75	5.74	5.51	0.01
17.00	5.77	5.53	0.01
17.25	5.79	5.56	0.01
17.50	5.82	5.58	0.01
17.75	5.84	5.60	0.01
18.00	5.87	5.63	0.01
18.25	5.89	5.65	0.01
18.50	5.91	5.67	0.01
18.75	5.93	5.69	0.01
19.00	5.95	5.71	0.01
19.25	5.97	5.73	0.01
19.50	5.98	5.75	0.01
19.75	6.00	5.76	0.01
20.00	**6.02**	**5.78**	0.01

Summary for Subcatchment 5S: Offsite Area 1

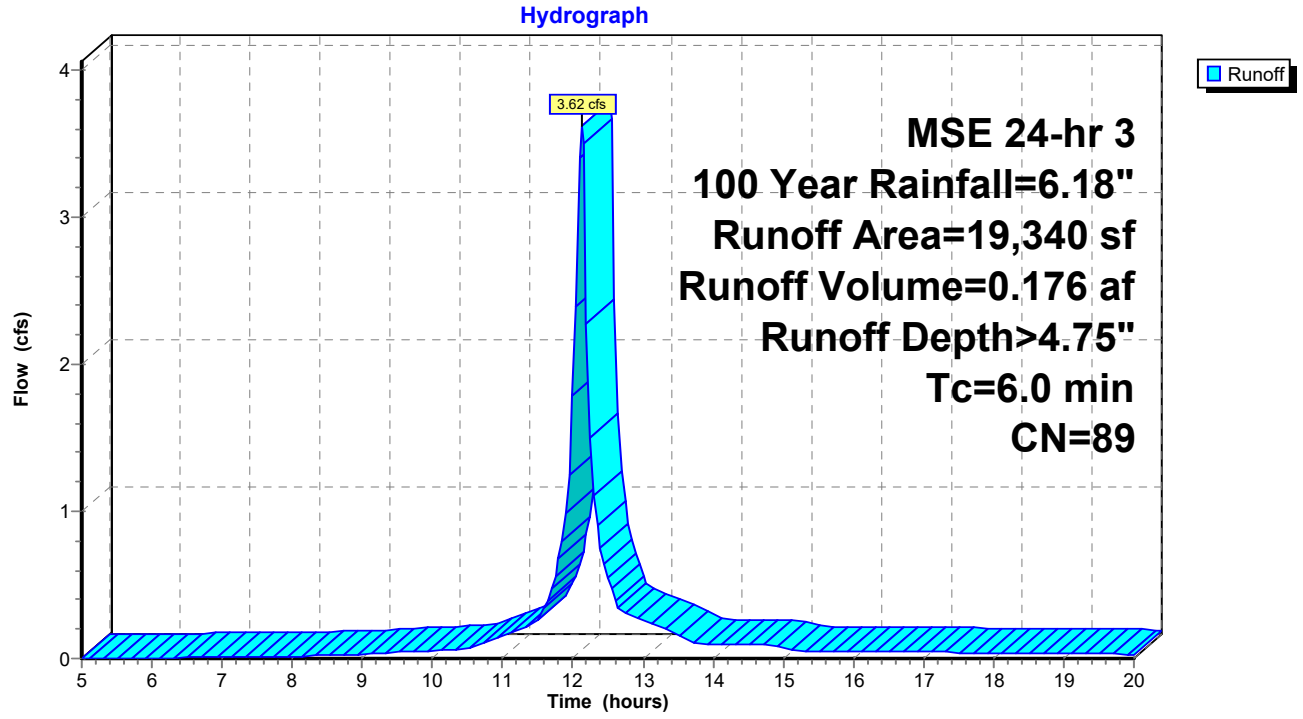
Runoff = 3.62 cfs @ 12.13 hrs, Volume= 0.176 af, Depth> 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

Area (sf)	CN	Description
9,160	98	Paved parking, HSG D
10,180	80	>75% Grass cover, Good, HSG D
19,340	89	Weighted Average
10,180		52.64% Pervious Area
9,160		47.36% Impervious Area

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

Subcatchment 5S: Offsite Area 1



Hydrograph for Subcatchment 5S: Offsite Area 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.23	0.00	0.00
5.25	0.25	0.00	0.00
5.50	0.27	0.00	0.00
5.75	0.29	0.00	0.00
6.00	0.31	0.00	0.00
6.25	0.34	0.01	0.00
6.50	0.36	0.01	0.01
6.75	0.39	0.01	0.01
7.00	0.41	0.02	0.01
7.25	0.44	0.02	0.01
7.50	0.46	0.03	0.01
7.75	0.49	0.04	0.01
8.00	0.52	0.05	0.02
8.25	0.55	0.06	0.02
8.50	0.58	0.07	0.02
8.75	0.61	0.08	0.02
9.00	0.64	0.09	0.02
9.25	0.69	0.12	0.04
9.50	0.74	0.14	0.04
9.75	0.79	0.17	0.05
10.00	0.85	0.20	0.05
10.25	0.91	0.23	0.06
10.50	0.97	0.26	0.06
10.75	1.06	0.33	0.11
11.00	1.19	0.41	0.16
11.25	1.35	0.52	0.20
11.50	1.53	0.66	0.25
11.75	1.90	0.95	0.55
12.00	2.86	1.77	**1.79**
12.25	4.28	3.09	**1.50**
12.50	4.65	3.44	0.55
12.75	4.83	3.61	0.31
13.00	4.99	3.76	0.26
13.25	5.12	3.88	0.21
13.50	5.21	3.98	0.16
13.75	5.27	4.03	0.10
14.00	5.33	4.09	0.10
14.25	5.39	4.14	0.10
14.50	5.44	4.19	0.09
14.75	5.49	4.25	0.09
15.00	5.54	4.29	0.09
15.25	5.57	4.32	0.05
15.50	5.60	4.35	0.05
15.75	5.63	4.38	0.05
16.00	5.66	4.41	0.05
16.25	5.69	4.44	0.05
16.50	5.72	4.46	0.05
16.75	5.74	4.49	0.05
17.00	5.77	4.51	0.04
17.25	5.79	4.54	0.04
17.50	5.82	4.56	0.04
17.75	5.84	4.58	0.04
18.00	5.87	4.60	0.04
18.25	5.89	4.63	0.04
18.50	5.91	4.65	0.04
18.75	5.93	4.67	0.04
19.00	5.95	4.69	0.03
19.25	5.97	4.70	0.03
19.50	5.98	4.72	0.03
19.75	6.00	4.74	0.03
20.00	**6.02**	**4.75**	0.03

Summary for Subcatchment 6S: Offsite Area 2

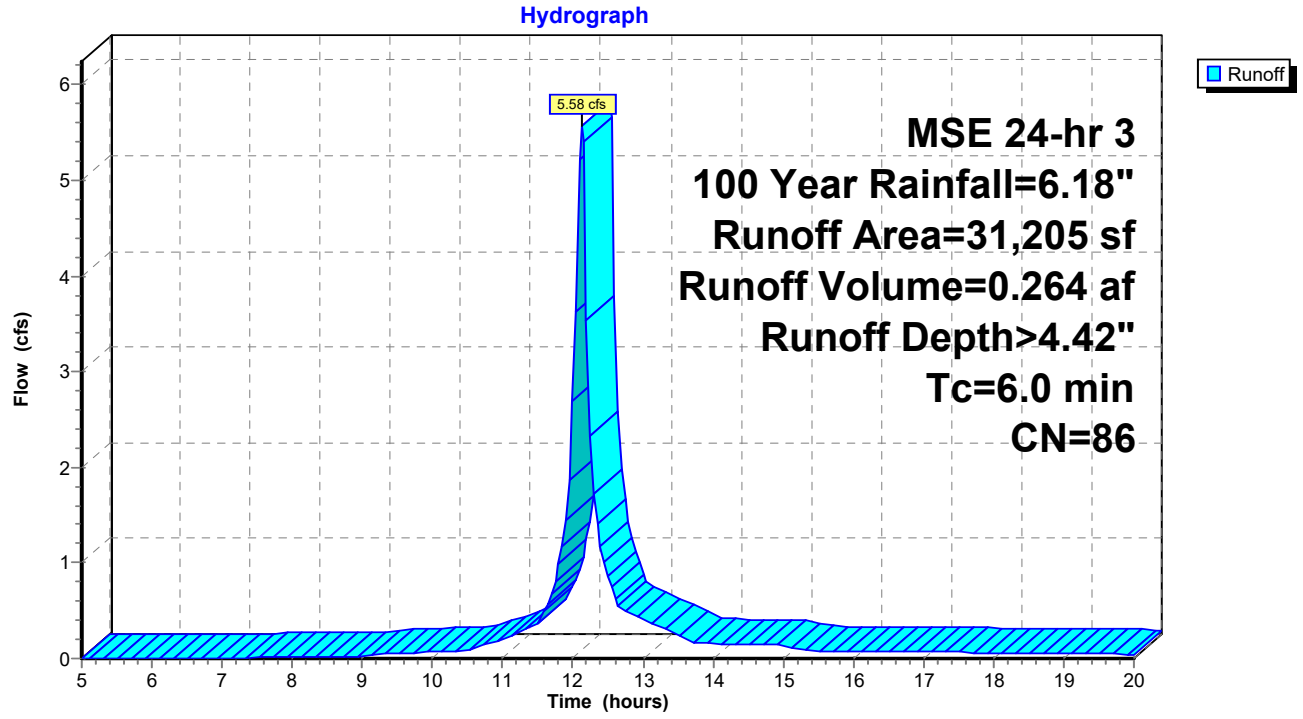
Runoff = 5.58 cfs @ 12.13 hrs, Volume= 0.264 af, Depth> 4.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

Area (sf)	CN	Description
10,685	98	Paved parking, HSG D
20,520	80	>75% Grass cover, Good, HSG D
31,205	86	Weighted Average
20,520		65.76% Pervious Area
10,685		34.24% Impervious Area

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

Subcatchment 6S: Offsite Area 2



Hydrograph for Subcatchment 6S: Offsite Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.23	0.00	0.00
5.25	0.25	0.00	0.00
5.50	0.27	0.00	0.00
5.75	0.29	0.00	0.00
6.00	0.31	0.00	0.00
6.25	0.34	0.00	0.00
6.50	0.36	0.00	0.00
6.75	0.39	0.00	0.00
7.00	0.41	0.00	0.01
7.25	0.44	0.01	0.01
7.50	0.46	0.01	0.01
7.75	0.49	0.01	0.01
8.00	0.52	0.02	0.02
8.25	0.55	0.03	0.02
8.50	0.58	0.03	0.02
8.75	0.61	0.04	0.02
9.00	0.64	0.05	0.03
9.25	0.69	0.07	0.05
9.50	0.74	0.08	0.05
9.75	0.79	0.10	0.06
10.00	0.85	0.13	0.07
10.25	0.91	0.15	0.07
10.50	0.97	0.18	0.08
10.75	1.06	0.23	0.15
11.00	1.19	0.30	0.21
11.25	1.35	0.39	0.28
11.50	1.53	0.51	0.36
11.75	1.90	0.77	0.80
12.00	2.86	1.54	**2.69**
12.25	4.28	2.80	**2.33**
12.50	4.65	3.14	0.86
12.75	4.83	3.31	0.49
13.00	4.99	3.46	0.41
13.25	5.12	3.57	0.33
13.50	5.21	3.67	0.25
13.75	5.27	3.72	0.16
14.00	5.33	3.78	0.16
14.25	5.39	3.83	0.15
14.50	5.44	3.88	0.15
14.75	5.49	3.93	0.14
15.00	5.54	3.98	0.14
15.25	5.57	4.01	0.08
15.50	5.60	4.03	0.08
15.75	5.63	4.06	0.08
16.00	5.66	4.09	0.08
16.25	5.69	4.12	0.08
16.50	5.72	4.14	0.07
16.75	5.74	4.17	0.07
17.00	5.77	4.19	0.07
17.25	5.79	4.21	0.07
17.50	5.82	4.24	0.07
17.75	5.84	4.26	0.06
18.00	5.87	4.28	0.06
18.25	5.89	4.30	0.06
18.50	5.91	4.32	0.06
18.75	5.93	4.34	0.06
19.00	5.95	4.36	0.05
19.25	5.97	4.38	0.05
19.50	5.98	4.40	0.05
19.75	6.00	4.41	0.05
20.00	**6.02**	**4.43**	0.05

Summary for Subcatchment 7S: Watershed Area 2

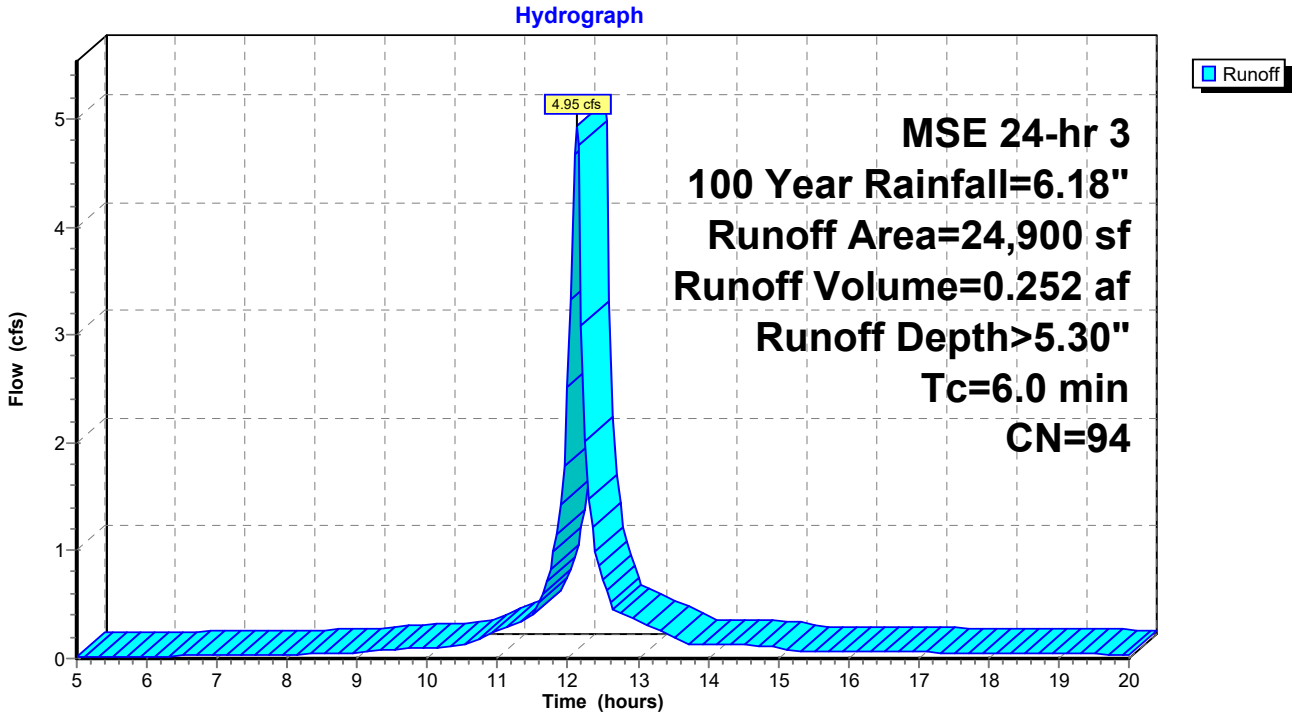
Runoff = 4.95 cfs @ 12.13 hrs, Volume= 0.252 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

Area (sf)	CN	Description
19,440	98	Paved parking, HSG D
5,460	80	>75% Grass cover, Good, HSG D
24,900	94	Weighted Average
5,460		21.93% Pervious Area
19,440		78.07% Impervious Area

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

Subcatchment 7S: Watershed Area 2



Hydrograph for Subcatchment 7S: Watershed Area 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.23	0.01	0.01
5.25	0.25	0.02	0.01
5.50	0.27	0.03	0.02
5.75	0.29	0.03	0.02
6.00	0.31	0.04	0.02
6.25	0.34	0.05	0.02
6.50	0.36	0.06	0.02
6.75	0.39	0.07	0.03
7.00	0.41	0.09	0.03
7.25	0.44	0.10	0.03
7.50	0.46	0.12	0.03
7.75	0.49	0.13	0.04
8.00	0.52	0.15	0.04
8.25	0.55	0.17	0.04
8.50	0.58	0.18	0.04
8.75	0.61	0.20	0.05
9.00	0.64	0.23	0.05
9.25	0.69	0.26	0.08
9.50	0.74	0.30	0.09
9.75	0.79	0.34	0.09
10.00	0.85	0.38	0.10
10.25	0.91	0.43	0.11
10.50	0.97	0.48	0.11
10.75	1.06	0.56	0.19
11.00	1.19	0.66	0.26
11.25	1.35	0.80	0.32
11.50	1.53	0.97	0.39
11.75	1.90	1.30	0.82
12.00	2.86	2.22	**2.53**
12.25	4.28	3.60	**2.02**
12.50	4.65	3.96	0.73
12.75	4.83	4.14	0.41
13.00	4.99	4.30	0.35
13.25	5.12	4.42	0.28
13.50	5.21	4.52	0.21
13.75	5.27	4.58	0.14
14.00	5.33	4.63	0.13
14.25	5.39	4.69	0.13
14.50	5.44	4.74	0.12
14.75	5.49	4.79	0.12
15.00	5.54	4.84	0.11
15.25	5.57	4.88	0.07
15.50	5.60	4.91	0.07
15.75	5.63	4.93	0.07
16.00	5.66	4.96	0.07
16.25	5.69	4.99	0.06
16.50	5.72	5.02	0.06
16.75	5.74	5.04	0.06
17.00	5.77	5.07	0.06
17.25	5.79	5.09	0.06
17.50	5.82	5.12	0.05
17.75	5.84	5.14	0.05
18.00	5.87	5.16	0.05
18.25	5.89	5.18	0.05
18.50	5.91	5.21	0.05
18.75	5.93	5.23	0.05
19.00	5.95	5.25	0.04
19.25	5.97	5.26	0.04
19.50	5.98	5.28	0.04
19.75	6.00	5.30	0.04
20.00	**6.02**	**5.32**	0.04

Summary for Pond 10P: Porous Pavement

Inflow Area = 0.572 ac, 78.07% Impervious, Inflow Depth > 5.30" for 100 Year event
Inflow = 4.95 cfs @ 12.13 hrs, Volume= 0.252 af
Outflow = 1.36 cfs @ 12.32 hrs, Volume= 0.247 af, Atten= 72%, Lag= 11.8 min
Primary = 1.36 cfs @ 12.32 hrs, Volume= 0.247 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 30.66' @ 12.32 hrs Surf.Area= 4,500 sf Storage= 3,964 cf

Plug-Flow detention time= 45.6 min calculated for 0.247 af (98% of inflow)
Center-of-Mass det. time= 37.5 min (782.6 - 745.1)

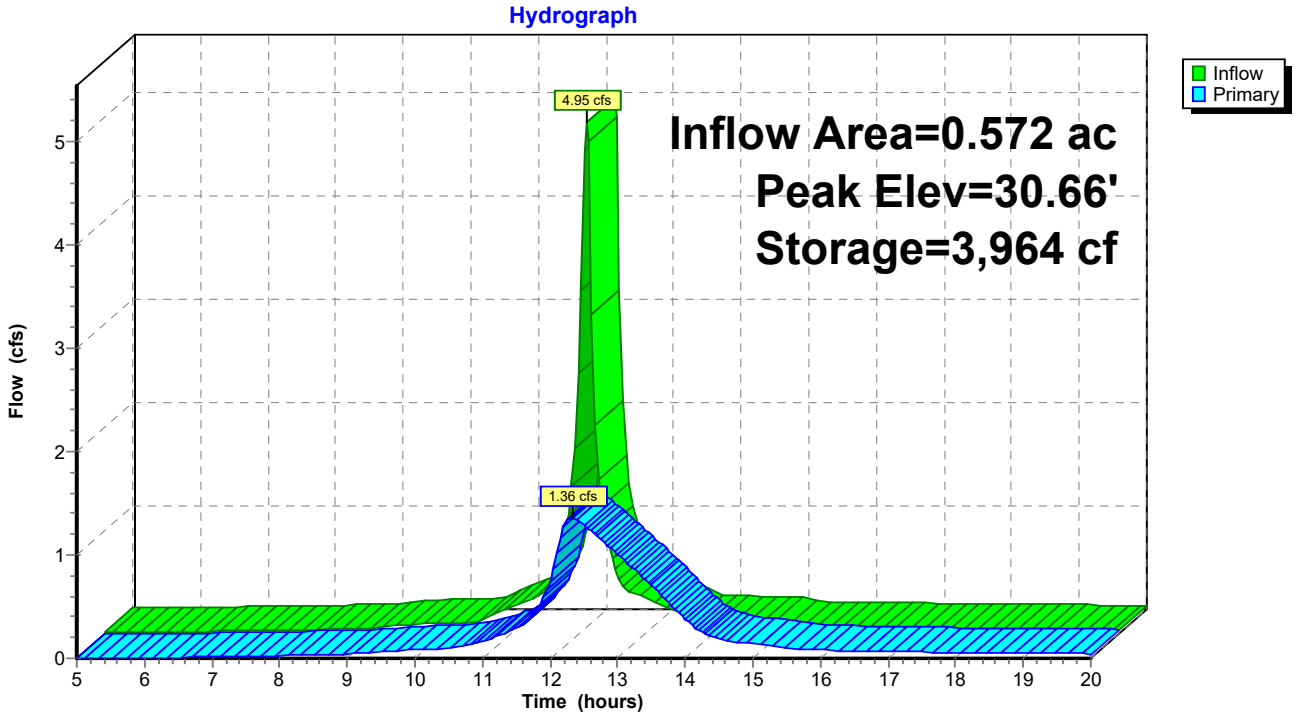
Volume	Invert	Avail.Storage	Storage Description
#1	28.34'	3,971 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.34	4,500	0.0	0	0
30.34	4,500	40.0	3,600	3,600
30.67	4,500	25.0	371	3,971

Device	Routing	Invert	Outlet Devices
#1	Primary	28.34'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.36 cfs @ 12.32 hrs HW=30.66' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.36 cfs @ 6.92 fps)

Pond 10P: Porous Pavement



Hydrograph for Pond 10P: Porous Pavement

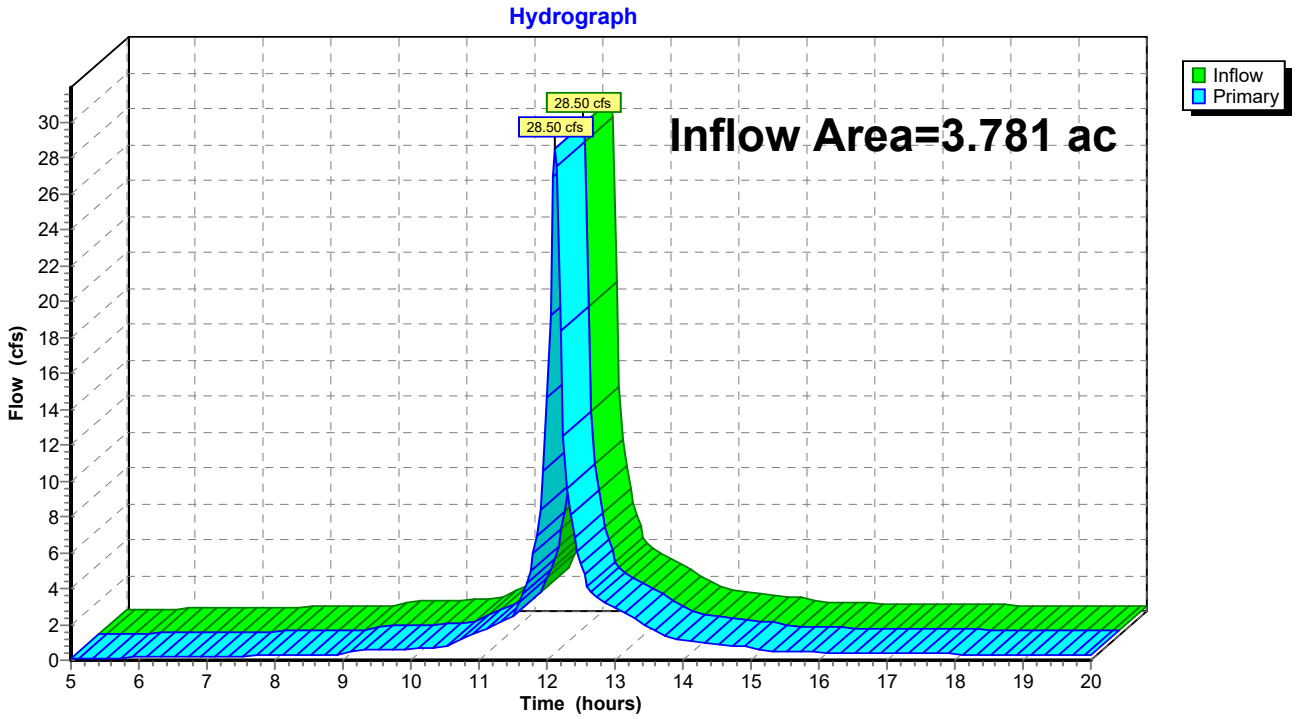
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.01	1	28.34	0.00
5.50	0.02	23	28.35	0.00
6.00	0.02	52	28.37	0.00
6.50	0.02	83	28.39	0.01
7.00	0.03	114	28.40	0.01
7.50	0.03	143	28.42	0.02
8.00	0.04	168	28.43	0.03
8.50	0.04	189	28.44	0.03
9.00	0.05	207	28.46	0.04
9.50	0.09	258	28.48	0.06
10.00	0.10	301	28.51	0.08
10.50	0.11	331	28.52	0.10
11.00	0.26	449	28.59	0.17
11.50	0.39	623	28.69	0.29
12.00	**2.53**	**1,583**	**29.22**	**0.75**
12.50	**0.73**	**3,744**	**30.47**	**1.30**
13.00	0.35	2,488	29.72	1.01
13.50	0.21	1,450	29.15	0.70
14.00	0.13	742	28.75	0.38
14.50	0.12	490	28.61	0.19
15.00	0.11	410	28.57	0.14
15.50	0.07	336	28.53	0.10
16.00	0.07	299	28.51	0.08
16.50	0.06	280	28.50	0.07
17.00	0.06	267	28.49	0.06
17.50	0.05	258	28.48	0.06
18.00	0.05	249	28.48	0.06
18.50	0.05	240	28.47	0.05
19.00	0.04	232	28.47	0.05
19.50	0.04	223	28.46	0.05
20.00	0.04	215	28.46	0.04

Summary for Link 1L: Proposed Total

Inflow Area = 3.781 ac, 78.04% Impervious, Inflow Depth > 5.26" for 100 Year event
Inflow = 28.50 cfs @ 12.13 hrs, Volume= 1.659 af
Primary = 28.50 cfs @ 12.13 hrs, Volume= 1.659 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 1L: Proposed Total

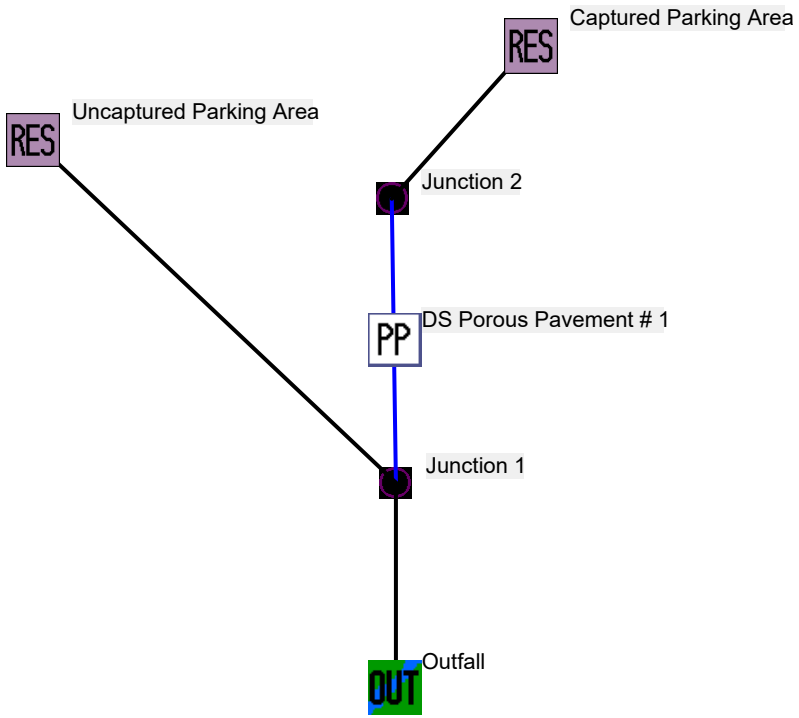


Hydrograph for Link 1L: Proposed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.11	**0.00**	0.11
5.25	0.12	0.00	0.12
5.50	0.13	0.00	0.13
5.75	0.14	0.00	0.14
6.00	0.15	0.00	0.15
6.25	0.17	0.00	0.17
6.50	0.18	0.00	0.18
6.75	0.19	0.00	0.19
7.00	0.21	0.00	0.21
7.25	0.22	0.00	0.22
7.50	0.24	0.00	0.24
7.75	0.25	0.00	0.25
8.00	0.27	0.00	0.27
8.25	0.28	0.00	0.28
8.50	0.30	0.00	0.30
8.75	0.31	0.00	0.31
9.00	0.33	0.00	0.33
9.25	0.53	0.00	0.53
9.50	0.57	0.00	0.57
9.75	0.61	0.00	0.61
10.00	0.64	0.00	0.64
10.25	0.68	0.00	0.68
10.50	0.72	0.00	0.72
10.75	1.19	0.00	1.19
11.00	1.59	0.00	1.59
11.25	2.00	0.00	2.00
11.50	2.44	0.00	2.44
11.75	4.97	0.00	4.97
12.00	**14.67**	0.00	**14.67**
12.25	**12.53**	0.00	**12.53**
12.50	5.35	0.00	5.35
12.75	3.46	0.00	3.46
13.00	2.93	0.00	2.93
13.25	2.42	0.00	2.42
13.50	1.89	0.00	1.89
13.75	1.29	0.00	1.29
14.00	1.11	0.00	1.11
14.25	0.96	0.00	0.96
14.50	0.88	0.00	0.88
14.75	0.82	0.00	0.82
15.00	0.78	0.00	0.78
15.25	0.51	0.00	0.51
15.50	0.48	0.00	0.48
15.75	0.46	0.00	0.46
16.00	0.44	0.00	0.44
16.25	0.43	0.00	0.43
16.50	0.42	0.00	0.42
16.75	0.40	0.00	0.40
17.00	0.39	0.00	0.39
17.25	0.38	0.00	0.38
17.50	0.37	0.00	0.37
17.75	0.35	0.00	0.35
18.00	0.34	0.00	0.34
18.25	0.33	0.00	0.33
18.50	0.32	0.00	0.32
18.75	0.31	0.00	0.31
19.00	0.30	0.00	0.30
19.25	0.29	0.00	0.29
19.50	0.27	0.00	0.27
19.75	0.26	0.00	0.26
20.00	0.25	0.00	0.25

APPENDIX C

STORM WATER QUALITY (WINSLAMM) MODELING


Captured Parking Area
RES
Uncaptured Parking Area
RES
Junction 2
DS Porous Pavement # 1
PP
Junction 1
Outfall
OUT

Data file name: I:\General Capital\19754 - E. St. Paul Waukesha\060 CAD\C - Civil\100 Modeling\Storm Sewer\030 WinSlamm\19754 WinSlamm.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 07-29-2021 Time: 14:43:51
Site information:

LU# 1 - Residential: Captured Parking Area Total area (ac): 0.346
13 - Paved Parking 1: 0.346 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Residential: Uncaptured Parking Area Total area (ac): 0.107
13 - Paved Parking 1: 0.107 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Porous Pavement CP# 1 (DS) - DS Porous Pavement # 1
Porous pavement area (ac): 0.103
Inflow hydrograph peak to average flow ratio: 3.8
Porous pavement thickness (in): 4
Porous pavement porosity: 0.2
Aggregate bedding thickness (in): 0
Aggregate bedding porosity: 0.3
Aggregate base reservoir thickness (in): 24
Aggregate base reservoir porosity: 0.4
Underdrain diameter (in): 6
Underdrain outlet invert elevation (inches above datum): 0
Number of underdrains: 1
Subgrade seepage rate (in/hr): 0.05
Use random number generation to account for uncertainty in seepage rate: 0
Subgrade seepage rate COV: 0
Surface pavement initial infiltration rate (in/hr): 100
Surface pavement initial infiltration rate (in/hr): 100
Surface Pavement Percent Solids Removal Upon Cleaning: 50
Porous pavement surface clogging load (lbs/sf): 0.06
Porous pavement restorative cleaning frequency: Annually
TSS concentration reduction percentage through underdrain: 0
Porous pavement particle size distribution file name: Not needed - calculated by program

SLAMM for Windows Version 10.4.1

Data file name: I:\General Capital\19754 - E. St. Paul Waukesha\060 CAD\C - Civil\100 Modeling\Storm Sewer\030 WinSlamm\19754 WinSlamm.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
Date of run: 07-29-2021 Time of run: 14:43:05
Total Area Modeled (acres): 0.453
Years in Model Run: 1.00

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	34476	-	130.0	279.8	-
Outfall Total with Controls:	29965	13.08%	53.27	99.65	64.39%
Annualized Total After Outfall Controls:	30048			99.92	

APPENDIX D

STORM WATER MANAGEMENT SYSTEM
MAINTENANCE REQUIREMENTS

Document Number

Stormwater Management Practice Maintenance Agreement

General Capital Acquisitions, LLC, as "Owner" of the property described below, in accordance with Chapter 14 Waukesha County Code of Ordinances, agrees to install and maintain stormwater management practice(s) on the subject property in accordance with approved plans and Stormwater Permit conditions. The owner further agrees to the terms stated in this document to ensure that the stormwater management practice(s) continues serving the intended functions in perpetuity. This Agreement includes the following exhibits:

Exhibit A: Legal Description of the real estate for which this Agreement applies ("Property").
Exhibit B: Location Map(s) – shows an accurate location of each stormwater management practice affected by this Agreement.
Exhibit C: Maintenance Plan – prescribes those activities that must be carried out to maintain compliance with this Agreement.

Note: After construction verification has been accepted by Waukesha County, for all planned stormwater management practices, an addendum(s) to this agreement shall be recorded by the Owner showing design and construction details. The addendum(s) may contain several additional exhibits, including certification by Waukesha County of Stormwater Permit termination, as described below.

Name and Return Address

Land Resources Division
515 W. Moreland Blvd., Rm AC
260 Waukesha, WI 53188

Through this Agreement, the Owner hereby subjects the Property to the following covenants, conditions, and restrictions:

1. The Owner shall be responsible for the routine and extraordinary maintenance and repair of the stormwater management practice(s) and drainage easements identified in Exhibit B until Stormwater Permit termination by Waukesha County in accordance with Chapter 14 of the County Code of Ordinances.
2. After Stormwater Permit termination under 1., the current Owner(s) shall be solely responsible for maintenance and repair of the stormwater management practices and drainage easements in accordance with the maintenance plan contained in Exhibit C.
3. Upon written notification by City of Waukesha or their designee, the Owner(s) shall, at their own cost and within a reasonable time period determined by the City of Waukesha, have an inspection of the stormwater management practice conducted by a qualified professional, file a report with the City of Waukesha and complete any maintenance or repair work recommended in the report. The Owner(s) shall be liable for the failure to undertake any maintenance or repairs.
4. In addition, and independent of the requirements under paragraph 3 above, the City of Waukesha, or its designee, is authorized to access the property as necessary to conduct inspections of the stormwater management practices or drainage easements to ascertain compliance with the intent of this Agreement and the activities prescribed in Exhibit C. The City of Waukesha may require work to be done which differs from the report described in paragraph 3 above, if the City of Waukesha reasonably concludes that such work is necessary and consistent with the intent of this agreement. Upon notification by the City of Waukesha of required maintenance or repairs, the Owner(s) shall complete the specified maintenance or repairs within a reasonable time frame determined by the City of Waukesha.
5. If the Owner(s) do not complete an inspection under 3. above or required maintenance or repairs under 4. above within the specified time period, the City of Waukesha is authorized, but not required, to perform the specified inspections, maintenance or repairs. In the case of an emergency situation, as determined by the City of Waukesha, no notice shall be required prior to the City of Waukesha performing emergency maintenance or repairs. The City of Waukesha may levy the costs and expenses of such inspections, maintenance, or repair related actions as a special charge against the Property and collected as such in accordance with the procedures under s. 66.0627 Wis. Stats. or subch. VII of ch. 66 Wis. Stats.
6. This Agreement shall run with the Property and be binding upon all heirs, successors, and assigns. After the Owner records the addendum noted above, the City of Waukesha shall have the sole authority to modify this agreement upon a 30-day notice to the current Owner(s).

Dated this___day of_____, 202_.

Owner:

_____

_____

Acknowledgements

State of Wisconsin:
County of Waukesha

Personally came before me this ____ day of_____, 202__, the above named _____ to me known to be the person who executed the foregoing instrument and acknowledged the same.

_____
Notary Public
My commission expires: _____

This document was drafted by:

_____

_____

The attached exhibits were drafted by:

The Sigma Group, Inc.
1300 W. Canal Street
Milwaukee, WI 53233

For Certification Stamp

Exhibit A – Legal Description

The following description and reduced copy map identifies the land parcel(s) affected by this Agreement. For a larger scale view of the referenced document, contact the Waukesha County Register of Deeds office.

Project Identifier: General Capital - Proposed Residential Riverfront Site **Acres:** 2.89
Date of Recording: July 1st, 2021
Map Produced By: Donald Chaput, 234 W Florida St, Milwaukee, WI 53204
Legal Description: Part of Lots Six (6), Seven (7), Eight (8), Nine (9), Ten (10) and Eleven (11) in Block Lettered "P" in NORTH WEST ADDITION TO VILLAGE PRAIRIEVILLE, Part of Lots One (1), Two (2) and All of Lots Three (3), Four (4), Five (5), Six (6), Seven (7), Eight (8), Nine (9) and Ten (10) in Block Lettered "B" in BERGELER'S ADDITION to the Village (now City) of Waukesha, and Lands being part of the Southeast and Southwest One-quarter (1/4) of the Northeast One-quarter (1/4) of Section Three (3), in Township Six (6) North, Range Nineteen (19) East, in the City of Waukesha, Waukesha County, Wisconsin.

Exhibit B - Location Map
Stormwater Management Practices Covered by this Agreement

The stormwater management practices covered by this Agreement are depicted in the reduced copy of a portion of the construction plans, as shown below. The practices include porous pavement and all associated pipes.

Development Name: General Capital - Proposed Residential Riverfront Site
Stormwater Practices: Porous Pavement
Location of Practices: East St. Paul Avenue, Waukesha, WI
Owner: General Capital Acquisitions, LLC

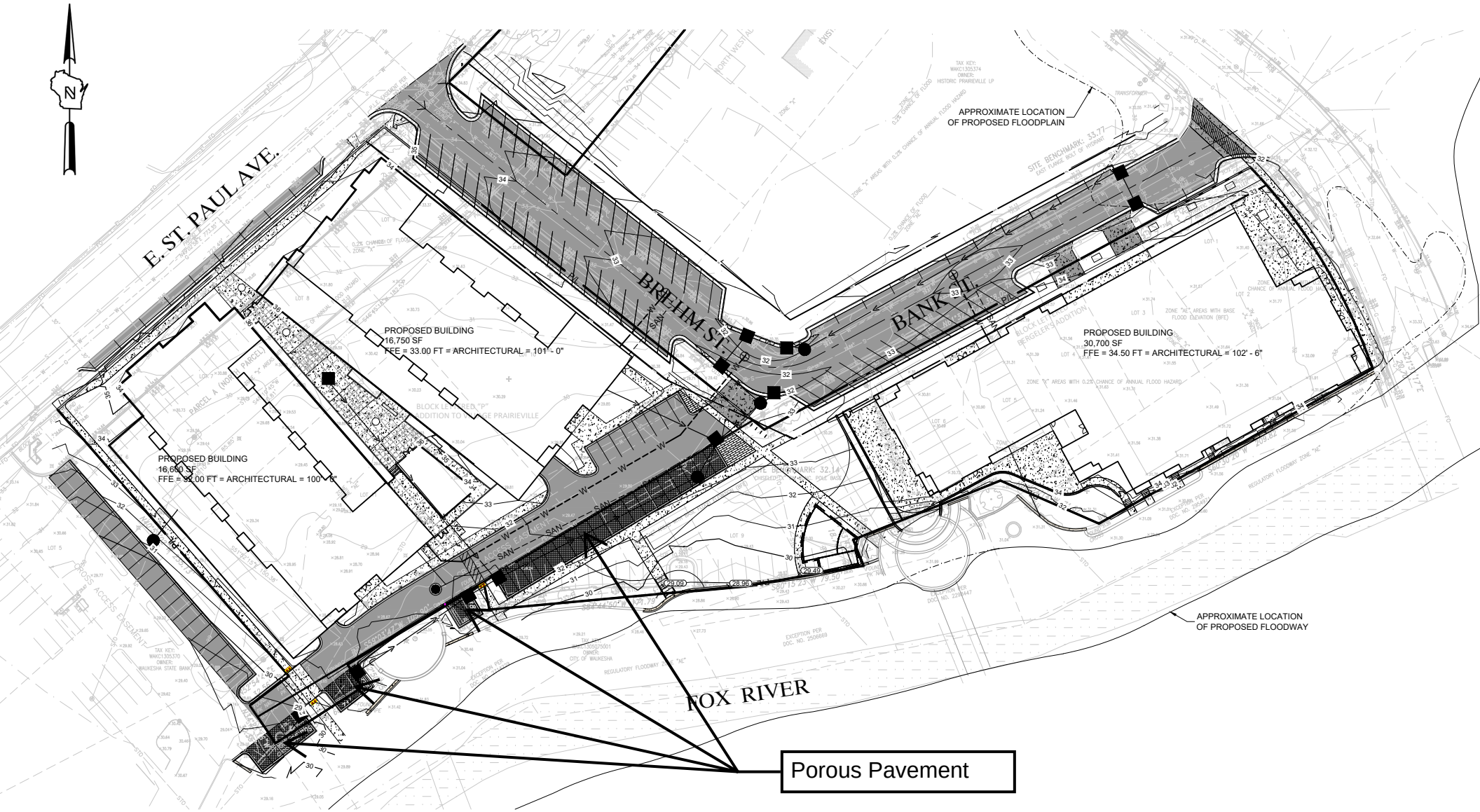

E. ST. PAUL AVE.
BREHM ST.
BANK ST.
PROPOSED BUILDING
16,750 SF
FFE = 33.00 FT = ARCHITECTURAL = 101' - 0"
PROPOSED BUILDING
16,650 SF
FFE = 32.00 FT = ARCHITECTURAL = 100' - 0"
PROPOSED BUILDING
30,700 SF
FFE = 34.50 FT = ARCHITECTURAL = 102' - 6"
APPROXIMATE LOCATION
OF PROPOSED FLOODPLAIN
APPROXIMATE LOCATION
OF PROPOSED FLOODWAY
FOX RIVER
Porous Pavement

Exhibit C
Stormwater Practice Maintenance Plan

This exhibit explains the basic function of each of the stormwater practices listed in **Exhibit B** and prescribes the minimum maintenance requirements to remain compliant with this Agreement. The maintenance activities listed below are aimed to ensure these practices continue serving their intended functions in perpetuity. The list of activities is not all inclusive, but rather indicates the minimum type of maintenance that can be expected for this particular site. Access to the stormwater practices for maintenance vehicles is shown in **Exhibit B**. Any failure of a stormwater practice that is caused by a lack of maintenance will subject the Owner(s) to enforcement of the provisions listed on page 1 of this Agreement by the City of Waukesha.

System Description:
The porous pavement system is designed to remove a minimum 40% of sediment in runoff from paved parking areas and roads and maintain pre-development downstream peak flows.

Porous Pavement Description:
The proposed porous pavement was designed with the following characteristics:

- 4" Porous Pavement
- 24" Stone storage layer
- 6" drain tile at the elevation of 28.34

Minimum Maintenance Requirements:
To ensure the proper long-term function of the storm water management practice described above, the following activities must be completed by the Facility Manager:

1. Annual inspection of permeable pavement to evaluate the following in accordance with WDNR TS 1008.
2. Clean the pavement surface shall be conducted at least twice per year (April and October) using industry recommended methods, such as regenerative air or vacuum sweeping.
3. Snow and ice – Sand and anti-icing pre-treatments should not be used on pervious pavements. Vacuum cleaning MUST be performed after the winter season. Snow removal should not be performed using front end loaders or skid loaders by either scooping or back dragging to avoid damaging the surface.
4. Hazardous/toxic substances should never be located/used near or on pavement – A spill prevention plan must be implemented where there is likelihood of spills from hazardous materials (e.g. gasoline for lawn mowers, antifreeze for cars, solvents, pesticides, & cleaning aids) that can adversely affect SW if spilled. Releases shall be corrected as soon as identified.
5. Outlets provide stable conveyance out of facility – Trash, debris, or sediment accumulation or evidence of erosion should be checked for, at a minimum, every April and October.
6. Permeable pavement shall be vacuum swept every May and November with a regenerative air sweeper.
7. Preventative measures such as raking and removing leaves, vacuum sweeping, limited and controlled application of pesticides and fertilizers, and other good housekeeping practices that prevent pollutants from mixing with stormwater should be taken.
8. Performance – Biannually, verify that pervious pavement is draining as designed. If pavement is not draining precipitation per the designed rate, and/or ponding water is visible on the surface 8 hours after a rain event, the system is likely clogged. System must receive a deep or regenerative cleaning. After cleaning has been complete, system must be tested to confirm it is performing within an accepted range per the design.

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EXISTING WATERSHED AREA			
Tc = 6.0 min.	SF	ACRE	CN
EXISTING			
IMPERVIOUS	101600	2.33	98
GREENSPACE	63100	1.45	84
TOTAL	164700	3.78	93

LEGEND:

GREENSPACE
(50-75% GRASS COVER, FAIR, HSG D)

IMPERVIOUS

TO OBTAIN LOCATIONS OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN

CALL DIGGERS HOTLINE
1-800-242-8511
TOLL FREE

WI STATUTE 182.0175(1974) REQUIRES MIN. 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE

MILW. AREA 259-1181

THE UNDERGROUND UTILITY INFORMATION SHOWN ON THIS MAP IS BASED ON FIELD MARKINGS AND INFORMATION FURNISHED BY UTILITY COMPANIES AND THE LOCAL MUNICIPALITY. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, ITS ACCURACY AND COMPLETENESS CANNOT BE GUARANTEED.

THE SIGMA GROUP
Single Source. Sound Solutions.
www.thesigmagroup.com
1300 West Canal Street
Milwaukee, WI 53233
Phone: 414-643-4200
Fax: 414-643-4210

GENERAL CAPITAL GROUP
6938 N. Santa Monica Blvd,
Fox Point, WI 53217
Phone: 414-228-3500

JOSEPH PROPERTY DEVELOPMENT
117 N. Jefferson ST. #200
Milwaukee, WI 53202
Phone: 414-988-7885

AG ARCHITECTURE
1414 Underwood Ave. #301
Wauwatosa, WI 53213
Phone: 414-4313131

E. ST. PAUL AVENUE
WAUKESHA, WISCONSIN

PRE-DEVELOPMENT CONDITIONS

NO.	REVISION	DATE	BY

DRAWING NO. 19754 SW 1.0.DWG
DRAWN BY: ##
DATE: ##########
PROJECT NO: #####
CHECKED BY: ##
APPROVED BY: ###
SHEET NO.:

SW 1.0

Legal Description:
Part of Lots Six (6), Seven (7), Eight (8), Nine (9), Ten (10) and Eleven (11) in Block Lettered "P" in NORTH WEST ADDITION TO VILLAGE PRAIRIEVILLE, Part of Lots One (1), Two (2) and All of Lots Three (3), Four (4), Five (5), Six (6), Seven (7), Eight (8), Nine (9) and Ten (10) in Block Lettered "B" in BERGELER'S ADDITION to the Village (now City) of Waukesha, and Lands being part of the Southeast and Southwest One-quarter (1/4) of the Northeast One-quarter (1/4) of Section Three (3), in Township Six (6) North, Range Nineteen (19) East, in the City of Waukesha, Waukesha County, Wisconsin.

ROOF AREA 1			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
ROOF	25800	0.59	98
TOTAL	25800	0.59	98

ROOF AREA 2			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
ROOF	26590	0.61	98
TOTAL	26590	0.61	98

ROOF AREA 3			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
ROOF	31915	0.73	98
TOTAL	31915	0.73	98

WATERSHED AREA 1			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
IMPERVIOUS	4950	0.11	98
GREENSPACE	0	0.00	80
TOTAL	4950	0.11	98

WATERSHED AREA 2			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
IMPERVIOUS	19440	0.45	98
GREENSPACE	5460	0.13	80
TOTAL	24900	0.57	94

OFFSITE AREA 1			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
IMPERVIOUS	9160	0.21	98
GREENSPACE	10180	0.23	80
TOTAL	19340	0.44	89

OFFSITE AREA 2			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
IMPERVIOUS	10685	0.25	98
GREENSPACE	20520	0.47	80
TOTAL	31205	0.72	86

LEGEND:

- GREENSPACE (>75% GRASS COVER, GOOD, HSG D)
- ROOF
- IMPERVIOUS

GRAPHIC SCALE
0 50' 100'

TO OBTAIN LOCATIONS OF PARTICIPATING UTILITY GROUND FACILITIES BEFORE YOU DIG IN WISCONSIN

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TOLL FREE
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MILW. AREA 259-1181

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AG ARCHITECTURE
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Wauwatosa, WI 53213
Phone: 414-4313131

E. ST. PAUL AVENUE WAUKESHA, WISCONSIN

POST-DEVELOPMENT CONDITIONS

NO.	REVISION	DATE	BY

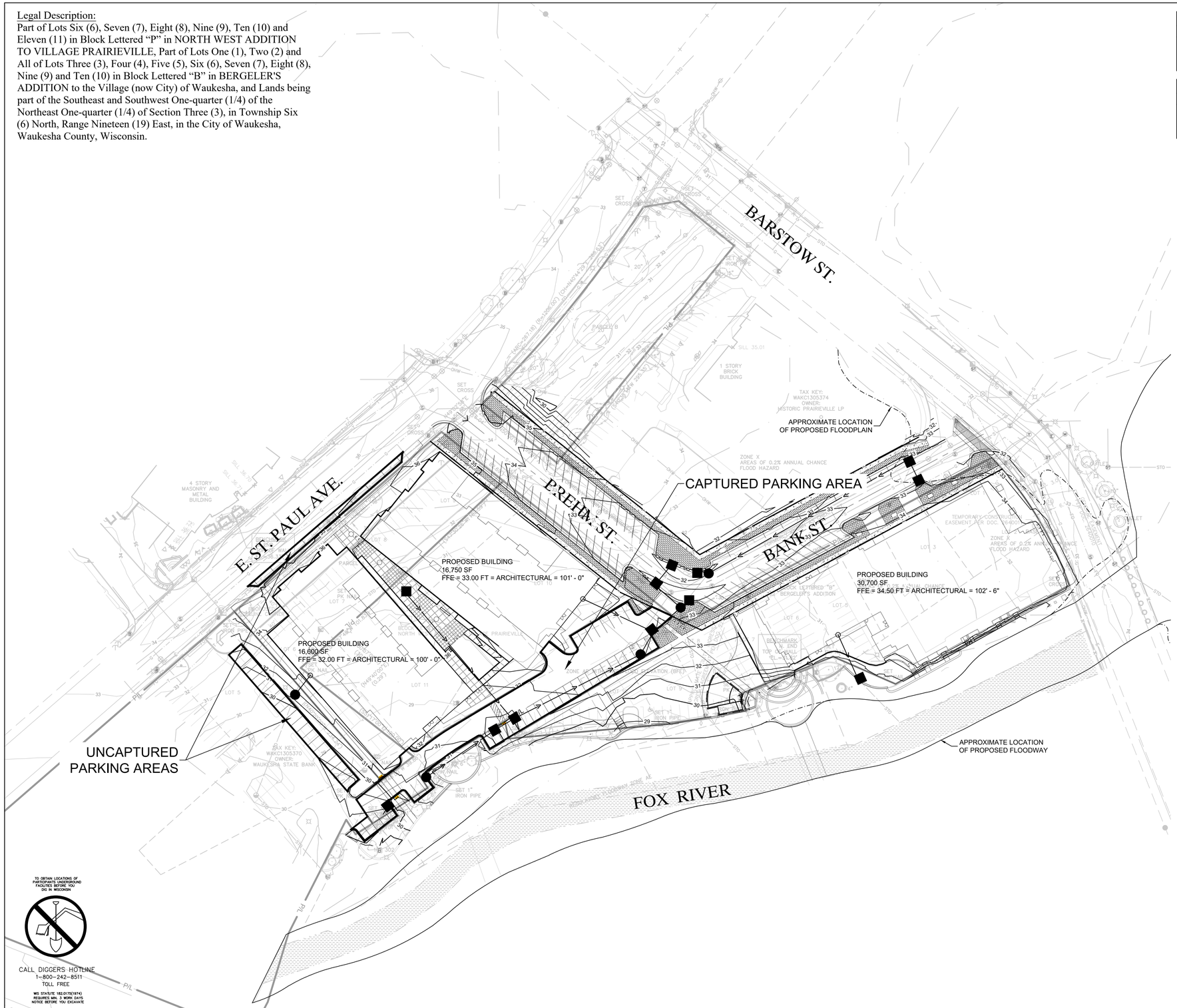
DRAWING NO.	19754 SW 2.0.DWG
DRAWN BY:	JRG
DATE:	06-07-2021
PROJECT NO:	19754
CHECKED BY:	TPM
APPROVED BY:	CTC
SHEET NO.:	

SW 2.0

Legal Description:
Part of Lots Six (6), Seven (7), Eight (8), Nine (9), Ten (10) and Eleven (11) in Block Lettered "P" in NORTH WEST ADDITION TO VILLAGE PRAIRIEVILLE, Part of Lots One (1), Two (2) and All of Lots Three (3), Four (4), Five (5), Six (6), Seven (7), Eight (8), Nine (9) and Ten (10) in Block Lettered "B" in BERGELER'S ADDITION to the Village (now City) of Waukesha, and Lands being part of the Southeast and Southwest One-quarter (1/4) of the Northeast One-quarter (1/4) of Section Three (3), in Township Six (6) North, Range Nineteen (19) East, in the City of Waukesha, Waukesha County, Wisconsin.

CAPTURED PARKING AREA			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
PARKING/ROAD	15075	0.346	98
TOTAL	15075	0.346	98

UNCAPTURED PARKING AREA			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
PARKING/ROAD	4645	0.107	98
TOTAL	4645	0.107	98



GRAPHIC SCALE
0 50' 100'

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TOLL FREE

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Wauwatosa, WI 53213
Phone: 414-4313131

E. ST. PAUL AVENUE
WAUKESHA, WISCONSIN

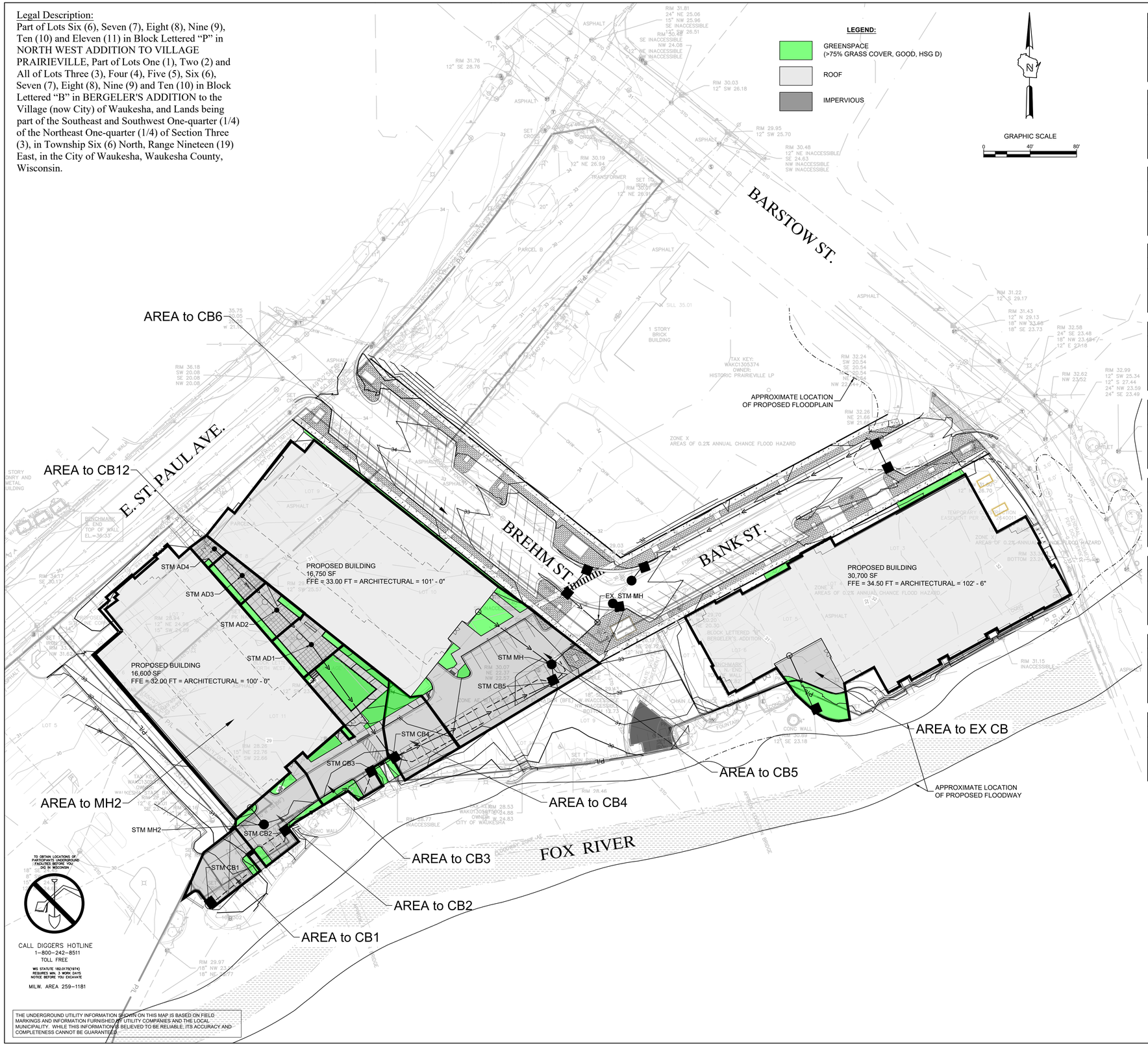
WINSLAMM EXHIBIT

NO.	REVISION	DATE	BY

DRAWING NO.	19754 SW 3.0 WINSLAMM.DWG
DRAWN BY:	##
DATE:	##########
PROJECT NO:	#####
CHECKED BY:	##
APPROVED BY:	###
SHEET NO.:	

SW 3.0

Legal Description:
Part of Lots Six (6), Seven (7), Eight (8), Nine (9), Ten (10) and Eleven (11) in Block Lettered "P" in NORTH WEST ADDITION TO VILLAGE PRAIRIEVILLE, Part of Lots One (1), Two (2) and All of Lots Three (3), Four (4), Five (5), Six (6), Seven (7), Eight (8), Nine (9) and Ten (10) in Block Lettered "B" in BERGELER'S ADDITION to the Village (now City) of Waukesha, and Lands being part of the Southeast and Southwest One-quarter (1/4) of the Northeast One-quarter (1/4) of Section Three (3), in Township Six (6) North, Range Nineteen (19) East, in the City of Waukesha, Waukesha County, Wisconsin.



AREA TO EX			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	1537	0.04	0.90
GREENSPACE	1024	0.02	0.20
TOTAL	2561	0.06	

AREA TO CB1			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	2154	0.05	0.90
GREENSPACE	125	0.00	0.20
TOTAL	2279	0.05	

AREA TO CB2			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	2645	0.06	0.90
GREENSPACE	577	0.01	0.20
TOTAL	3222	0.07	

AREA TO CB3			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	4201	0.10	0.90
GREENSPACE	2483	0.06	0.20
TOTAL	6684	0.15	

AREA TO CB4			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	2757	0.06	0.90
GREENSPACE	383	0.01	0.20
TOTAL	3140	0.07	

AREA TO CB5			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	9426	0.22	0.90
GREENSPACE	1281	0.03	0.20
TOTAL	10707	0.25	

AREA TO AD1			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	1390	0.03	0.90
GREENSPACE	326	0.01	0.20
TOTAL	1716	0.04	

AREA TO AD2			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	1045	0.02	0.90
GREENSPACE	358	0.01	0.20
TOTAL	1403	0.03	

AREA TO AD3			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	821	0.02	0.90
GREENSPACE	238	0.01	0.20
TOTAL	1059	0.02	

AREA TO AD4			
Tc = 5.0 min.	SF	ACRE	C
PROPOSED			
IMPERVIOUS	415	0.01	0.90
GREENSPACE	34	0.00	0.20
TOTAL	449	0.01	

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AG ARCHITECTURE
1414 Underwood Ave. #301
Wauwatosa, WI 53213
Phone: 414-4313131

E. ST. PAUL AVENUE
WAUKESHA, WISCONSIN

INLET DRAINAGE MAP

NO.	REVISION	DATE	BY

DRAWING NO. 19754 SW 4.0 INLET DRAINAGE MAP.DWG
DRAWN BY: JRG
DATE: 06-07-2021
PROJECT NO: 19754
CHECKED BY: TPM
APPROVED BY: CTC
SHEET NO.:

SW 4.0

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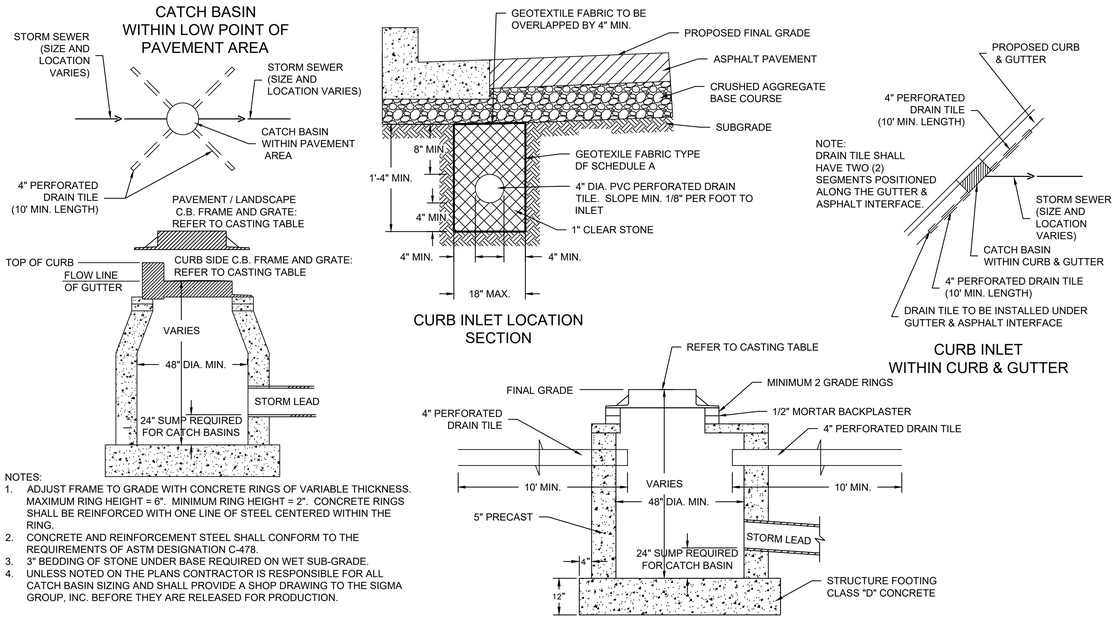


NOTES:

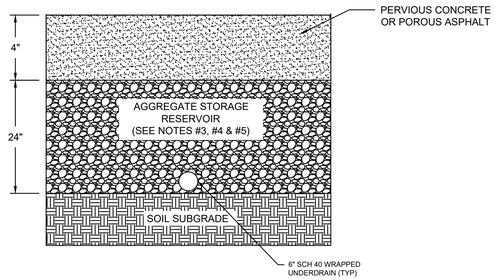
1. ADJUST FRAME TO GRADE WITH CONCRETE RINGS OF VARIABLE THICKNESS. MAXIMUM RING HEIGHT = 6". MINIMUM RING HEIGHT = 2". CONCRETE RINGS SHALL BE REINFORCED WITH ONE LINE OF STEEL CENTERED WITHIN THE RING.
2. CONCRETE AND REINFORCEMENT STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION C-478.
3. 3" BEDDING OF STONE UNDER BASE REQUIRED ON WET SUB-GRADE.
4. UNLESS NOTED ON THE PLANS CONTRACTOR IS RESPONSIBLE FOR ALL CATCH BASIN SIZING AND SHALL PROVIDE A SHOP DRAWING TO THE SIGMA GROUP, INC. BEFORE THEY ARE RELEASED FOR PRODUCTION.

CATCH BASIN / INET CASTING TABLE

	IF 18" CURB & GUTTER		IF 24" CURB & GUTTER		IF 30" CURB AND GUTTER	
	CASTING	GRATE	CASTING	GRATE	CASTING	GRATE
CURB INLET	NEENAH R-3170	B	NEENAH R-3067	A	NEENAH R-3228H	C
AREA INLET	NEENAH R-2050	C				

A INLET AND CATCH BASIN

NOT TO SCALE



NOTES:

1. PAVEMENT SURFACE PERCENT VOIDS SHOULD BE LESS THAN 25%.
2. JOINT STONE AND BEDDING COURSE SHALL CONSIST OF ASTM C-33, 8, 9, 89, OR 57 AGGREGATE.
3. AGGREGATE STORAGE RESERVOIR DEPTH SHALL BE A MINIMUM OF 12 INCHES. AGGREGATE STORAGE RESERVOIR SHALL USE AN OPEN GRADED BASE CONSISTING OF CRUSHED STONE OR CRUSHED GRAVEL WITH NO GRATER THAN 5% PASSING THE NO. 200 SIEVE.
4. BASE AND/OR SUBBASE COURSES WITH MINIMUM POROSITY OF 30% CAN BE CONSIDERED AGGREGATE STORAGE RESERVOIR, BASE COURSE FOR PERVIOUS PAVEMENT SHALL BE 5.0" DEPTH OF ASTM C-33, 57 AGGREGATE AND CAN BE CONSIDERED PART OF THE AGGREGATE STORAGE DEPTH.
5. UNDERDRAINS CAN BE LOCATED WITHIN OR BELOW THE AGGREGATE STORAGE RESERVOIR. UNDERDRAINS (OR EQUIVALENT) ARE REQUIRED IF THE AGGREGATE STORAGE RESERVOIR DRAIN DOWN TIME WILL EXCEED 72 HOURS.
6. THE SLOPE OF THE SUBGRADE SHALL BE AS FLAT AS POSSIBLE BUT NO GREATER THAN 2%.
7. POROUS PAVEMENT SHALL CONFORM TO THE WDNR TECHNICAL STANDARD #1008

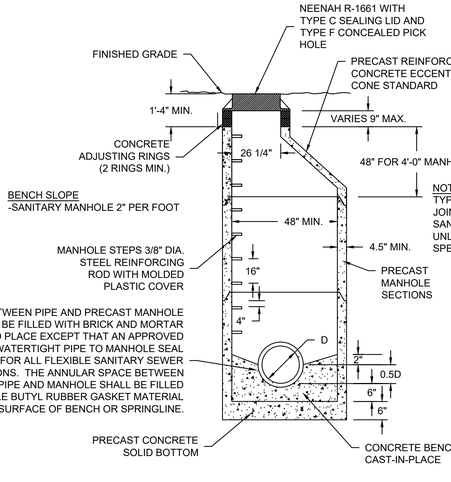
PERMEABLE PAVEMENT CONSTRUCTION PRACTICES:

POTENTIAL ADVERSE IMPACTS ASSOCIATED WITH CONSTRUCTION OPERATIONS SHALL BE MINIMIZED OR MITIGATED AS FOLLOWS:

1. PRIOR TO THE START OF CONSTRUCTION, THE SCHEDULE OF PERMEABLE PAVEMENT SYSTEM CONSTRUCTION RELATIVE TO OTHER CONSTRUCTION OPERATIONS AT THE SITE SHALL BE DETERMINED.
2. PROTECT THE SUBGRADE SOILS INTERFACE, AGGREGATE STORAGE RESERVOIR AND PAVEMENT SURFACE FROM CONSTRUCTION SITE RUNOFF UNTIL ACHIEVING FINAL STABILIZATION:
   - 2.a. WHERE POSSIBLE, DIVERT RUNOFF FROM DISTURBED AREAS AWAY FROM ENTERING THE PERMEABLE PAVEMENT SYSTEM, AND
   - 2.b. IF RUNOFF DIVERSION IS NOT POSSIBLE, PROTECT THE PERMEABLE PAVEMENT SYSTEM IN A MANNER THAT PREVENTS SEDIMENT AND POLLUTANTS FROM ENTERING TO THE MAXIMUM EXTENT PRACTICABLE.
3. PROTECT THE SUBGRADE SOIL INTERFACE, AGGREGATE STORAGE RESERVOIR AND PAVEMENT SURFACE FROM OTHER CONSTRUCTION SITE OPERATIONS, SUCH AS LANDSCAPE EQUIPMENT OPERATION OR MATERIAL STORAGE.
4. AGGREGATE SHALL BE STORED AND HANDLED TO KEEP SEDIMENT-FREE AND PLACE TO AVOID SEGREGATION OF THE AGGREGATE.
5. WHEN CONSTRUCTION IS COMPLETE, INSPECT THE PERMEABLE PAVEMENT SURFACE AND, IF NECESSARY, CLEAN THE SURFACE USING INDUSTRY RECOMMENDED METHODS, SUCH AS REGENERATIVE AIR OR VACUUM SWEEPING.

B PERMEABLE ASPHALT

NOT TO SCALE

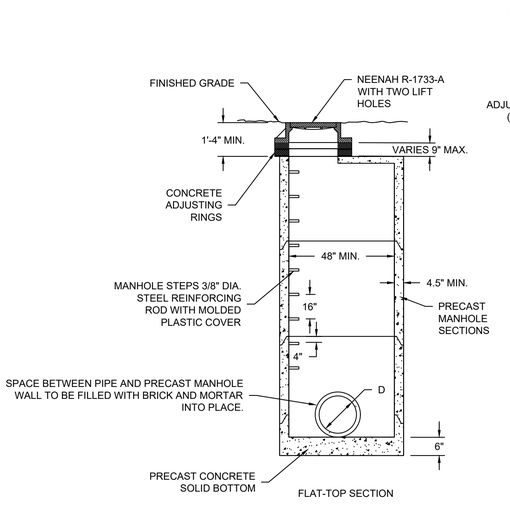


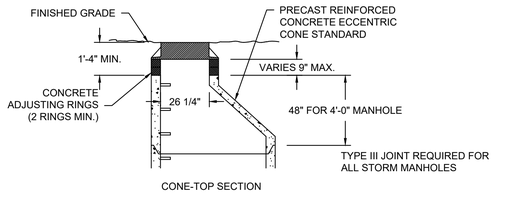
NOTES:

1. CONSTRUCT MANHOLE IN ACCORDANCE WITH FILE NO. 12 OF THE STATE STANDARD SPECIFICATIONS FOR SEWER AND WATER.
2. ADJUST FRAME TO GRADE WITH CONCRETE RINGS OF VARIABLE THICKNESS. MAXIMUM RING HEIGHT = 6". MINIMUM RING HEIGHT = 2". CONCRETE RINGS SHALL BE REINFORCED WITH ONE LINE OF STEEL CENTERED WITHIN THE RING. WHERE NECESSARY RINGS SHALL BE GROOVED TO RECEIVE STEP.
3. CONCRETE AND REINFORCEMENT STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION C-478.
4. JOINTS SHALL BE WATERTIGHT AND SHALL BE MADE USING FLEXIBLE RUBBER TYPE GASKETS.
5. AREA OF CIRCUMFERENTIAL STEEL = 0.12 SQ. INCH PER LINEAL FOOT MIN.
6. 3" OF BEDDING STONE UNDER BASE.
7. ALL SANITARY MANHOLES SHALL BE PROVIDED WITH EXTERNAL CHIMNEY SEALS AND SELF-SEALING LIDS WITH CONCEALED PICK HOLES.
8. UNLESS NOTED ON THE PLANS, THE CONTRACTORS IS RESPONSIBLE FOR ALL MANHOLE SIZING AND SHALL PROVIDE A SHOP DRAWING TO THE SIGMA GROUP, INC. BEFORE THEY ARE RELEASED FOR PRODUCTION.

C PRECAST SANITARY MANHOLE

NOT TO SCALE





NOTES:

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3. CONCRETE AND REINFORCEMENT STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION C-478.
4. JOINTS SHALL BE WATERTIGHT AND SHALL BE MADE USING MORTAR, OR FLEXIBLE RUBBER TYPE GASKETS FOR STORM MANHOLES.
5. AREA OF CIRCUMFERENTIAL STEEL = 0.12 SQ. INCH PER LINEAL FOOT MIN.
6. 3" OF BEDDING STONE UNDER BASE.
7. UNLESS NOTED ON THE PLANS CONTRACTOR IS RESPONSIBLE FOR ALL MANHOLE SIZING AND SHALL PROVIDE A SHOP DRAWING TO THE SIGMA GROUP, INC. BEFORE THEY ARE RELEASED FOR PRODUCTION.

D PRECAST STORM MANHOLE

NOT TO SCALE

THE SIGMA GROUP
Single Source. Sound Solutions.
www.thesigmagroup.com
1300 West Canal Street
Milwaukee, WI 53233
Phone: 414-643-4200
Fax: 414-643-4210

GENERAL CAPITAL GROUP
6938 N. Santa Monica Blvd,
Fox Point, WI 53217
Phone: 414-228-3500

JOSEPH PROPERTY
DEVELOPMENT
117 N. Jefferson ST. #200
Milwaukee, WI 53202
Phone: 414-988-7885

AG ARCHITECTURE
1414 Underwood Ave. #301
Wauwatosa, WI 53213
Phone: 414-4313131

E. ST. PAUL AVENUE
WAUKESHA, WISCONSIN

DETAILS

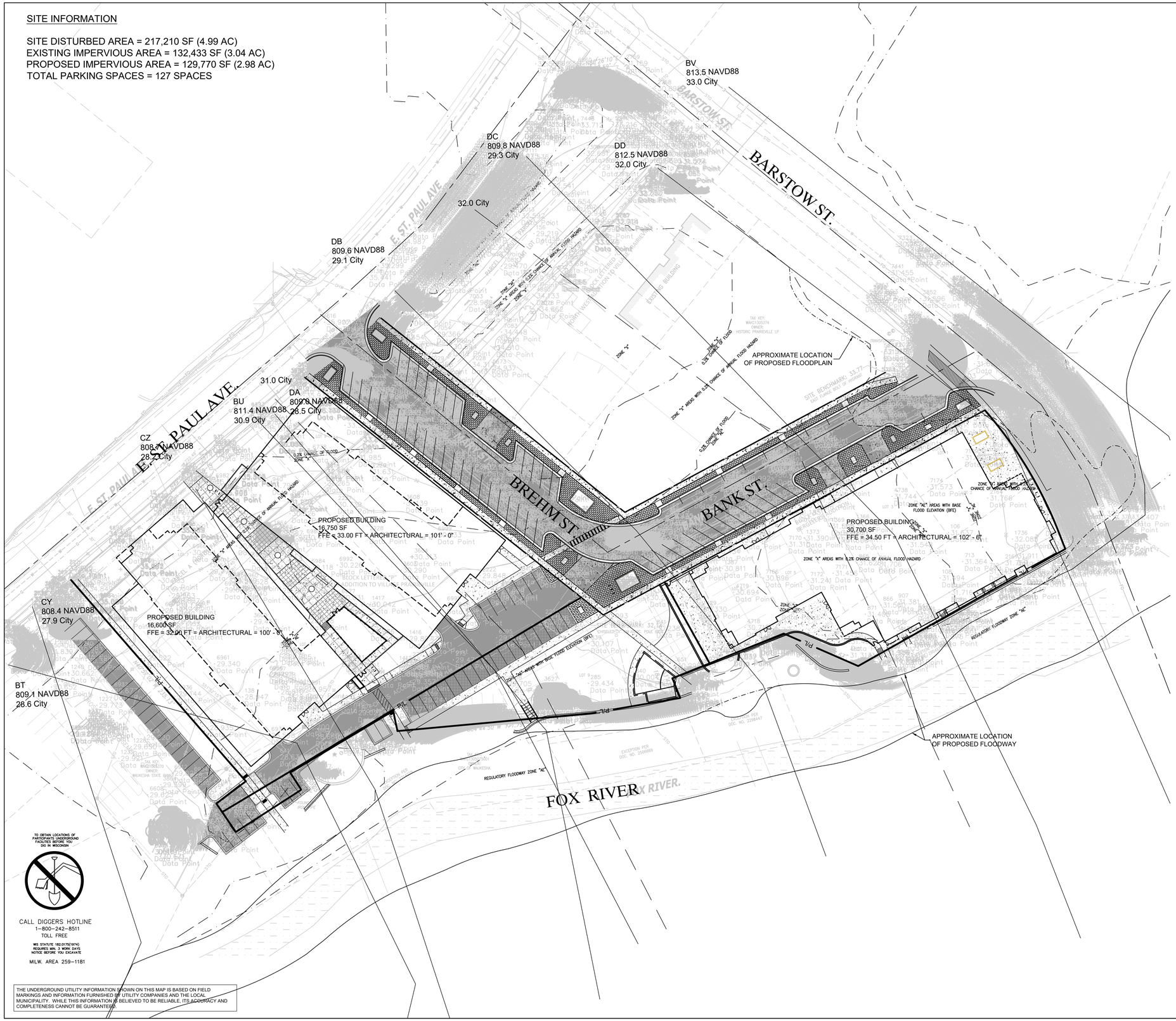
NO.	REVISION	DATE	BY

DRAWING NO.	19754 DETAILS.DWG
DRAWN BY:	##
DATE:	##########
PROJECT NO:	19754
CHECKED BY:	##
APPROVED BY:	###
SHEET NO.:	

C403

SITE INFORMATION

SITE DISTURBED AREA = 217,210 SF (4.99 AC)
EXISTING IMPERVIOUS AREA = 132,433 SF (3.04 AC)
PROPOSED IMPERVIOUS AREA = 129,770 SF (2.98 AC)
TOTAL PARKING SPACES = 127 SPACES



TO OBTAIN LOCATIONS OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN

CALL DIGGERS HOTLINE
1-800-242-8511
TOLL FREE

WIS STATUTE 182.0175(1974) REQUIRES MIN. 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE

MILW. AREA 259-1181

THE UNDERGROUND UTILITY INFORMATION SHOWN ON THIS MAP IS BASED ON FIELD MARKINGS AND INFORMATION FURNISHED BY UTILITY COMPANIES AND THE LOCAL MUNICIPALITY. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, ITS ACCURACY AND COMPLETENESS CANNOT BE GUARANTEED.

GENERAL NOTES:

1. THE UNDERGROUND UTILITY INFORMATION SHOWN ON THIS DRAWING IS BASED ON FIELD LOCATIONS AND/OR RECORDS FURNISHED BY MUNICIPALITIES AND UTILITY COMPANIES. THE LOCATION AND ACCURACY OF WHICH CANNOT BE GUARANTEED. THERE MAY BE ADDITIONAL UNDERGROUND UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.
2. VERIFY ACTUAL LOCATIONS AND INVERTS IN THE FIELD. ANY POTENTIAL ERRORS, OMISSIONS, OR DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
3. WORK TO BE COMPLETED IS INDICATED IN BOLD TYPE LINES AND EXISTING CONDITIONS ARE INDICATED BY LIGHT TYPE LINES.
4. ELECTRONIC CIVIL FILES ARE AVAILABLE UPON WRITTEN REQUEST. DO NOT USE ELECTRONIC CIVIL FILES TO LAYOUT FOUNDATIONS, COLUMN LINES, LIGHT POLES, OR OTHER NON CIVIL SITE WORK. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS OF BUILDING AND ARCHITECTURAL FEATURES.
5. DIMENSIONS ARE FROM FACE OF CURB OR EDGE OF PAVEMENT.
6. WORK WITHIN THE PUBLIC RIGHT OF WAY, INCLUDING BUT NOT LIMITED TO DRIVEWAY OPENINGS, SIDEWALK AND RAMPS, PAVING, AND CURB AND GUTTER SHALL BE COMPLETED PER MUNICIPAL AND/OR COUNTY REQUIREMENTS AND STANDARDS.

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Wauwatosa, WI 53213
Phone: 414-4313131

E. ST. PAUL AVENUE WAUKESHA, WISCONSIN

EXISTING FLOOD PLAIN EXHIBIT

NO.	REVISION	DATE	BY

DRAWING NO.	19754 FLOOD PLAIN EXHIBIT.DWG
DRAWN BY:	JRG
DATE:	06-07-2021
PROJECT NO:	19754
CHECKED BY:	TPM
APPROVED BY:	CTC
SHEET NO.:	EX FP1

SITE INFORMATION

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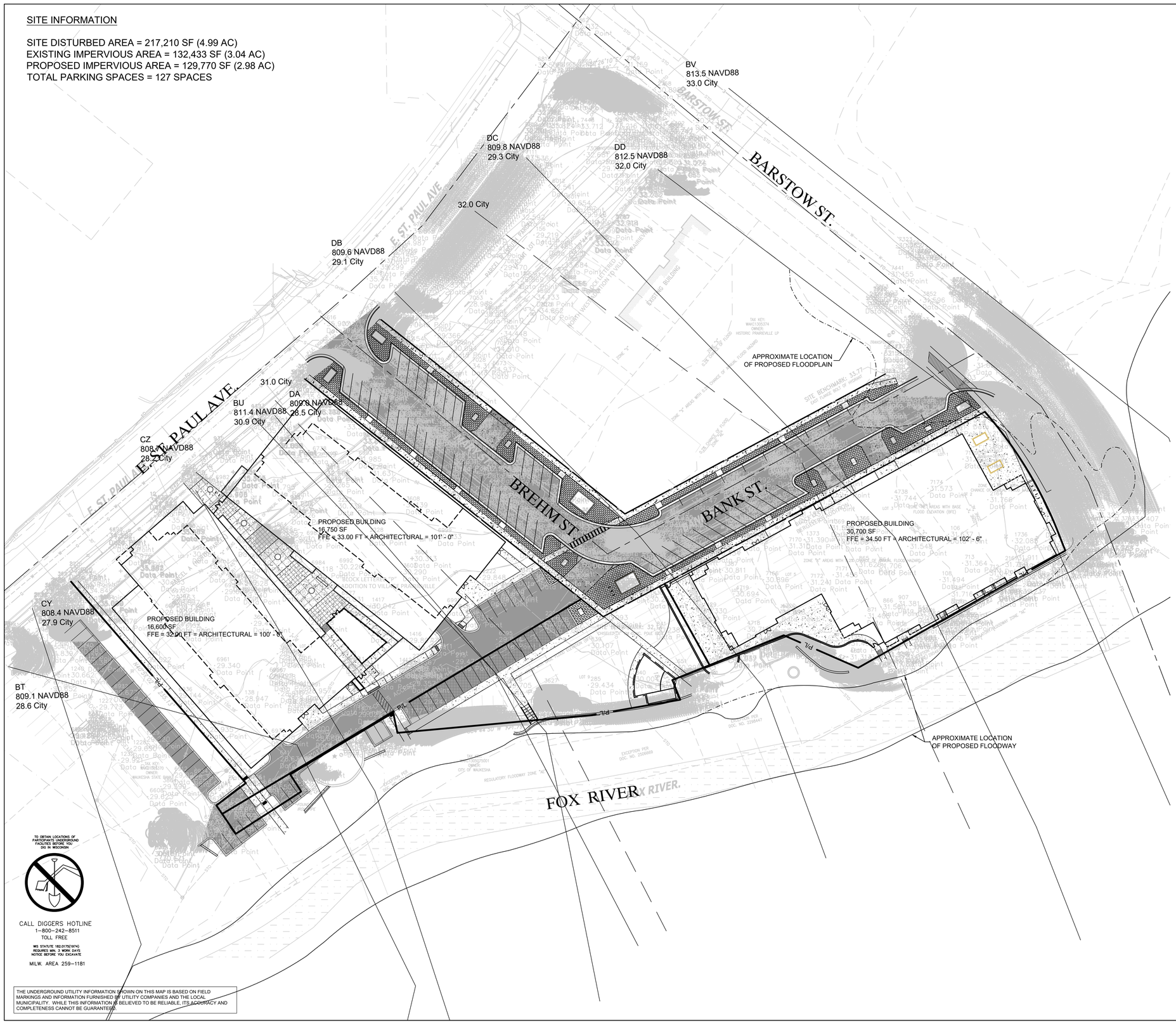
PROPOSED IMPERVIOUS AREA = 129,770 SF (2.98 AC)
TOTAL PARKING SPACES = 127 SPACES



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E. ST. PAUL AVENUE
WAUKESHA, WISCONSIN

PROPOSED FLOOD PLAIN EXHIBIT

NO.	REVISION	DATE	BY

DRAWING NO.	19754 FLOOD PLAIN EXHIBIT.DWG
DRAWN BY:	JRG
DATE:	06-07-2021
PROJECT NO:	19754
CHECKED BY:	TPM
APPROVED BY:	CTC
SHEET NO.:	

EX FP2