

DRAINAGE STATEMENT

For

Crestmont Country Club

Proposed Pickle Ball Courts

**Block 1.01, Lot 174
West Orange Township, Essex County, NJ**

Prepared by:



**4 AAA Drive
Hamilton, NJ 08691
(609) 689-1100**

A handwritten signature in black ink, appearing to read 'James Bash', written over a horizontal line.

**James Bash, PE
NJ Professional Engineer License #52258**

**May 2023
Revised June 2023
VCEA # 2301WOT**

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Drainage Summary	2

APPENDIX

NRCS Soil Survey

100-year storm Routings

I. Drainage Summary

This Drainage Statement has been prepared to define and analyze the stormwater drainage conditions that would occur as a result of the proposed development of Block 1.01, Lot 174 as shown on the West Orange Township tax map. The subject site consists of 146.752 acres and is known as the Crestmont Country Club. This analysis will focus on the 0.23 acres that will be disturbed as part of the project. This disturbed area will be referred to as “the site” in this report.

Under the existing conditions the site contains four (4) tennis courts with a removable bubble, two (2) outdoor courts and gravel access drives. The proposed site improvements will consist of the construction of three (3) pickle ball courts. The proposed improvements to the site will increase lot coverage by 0.059 acres. No motor vehicle surfaces are proposed.

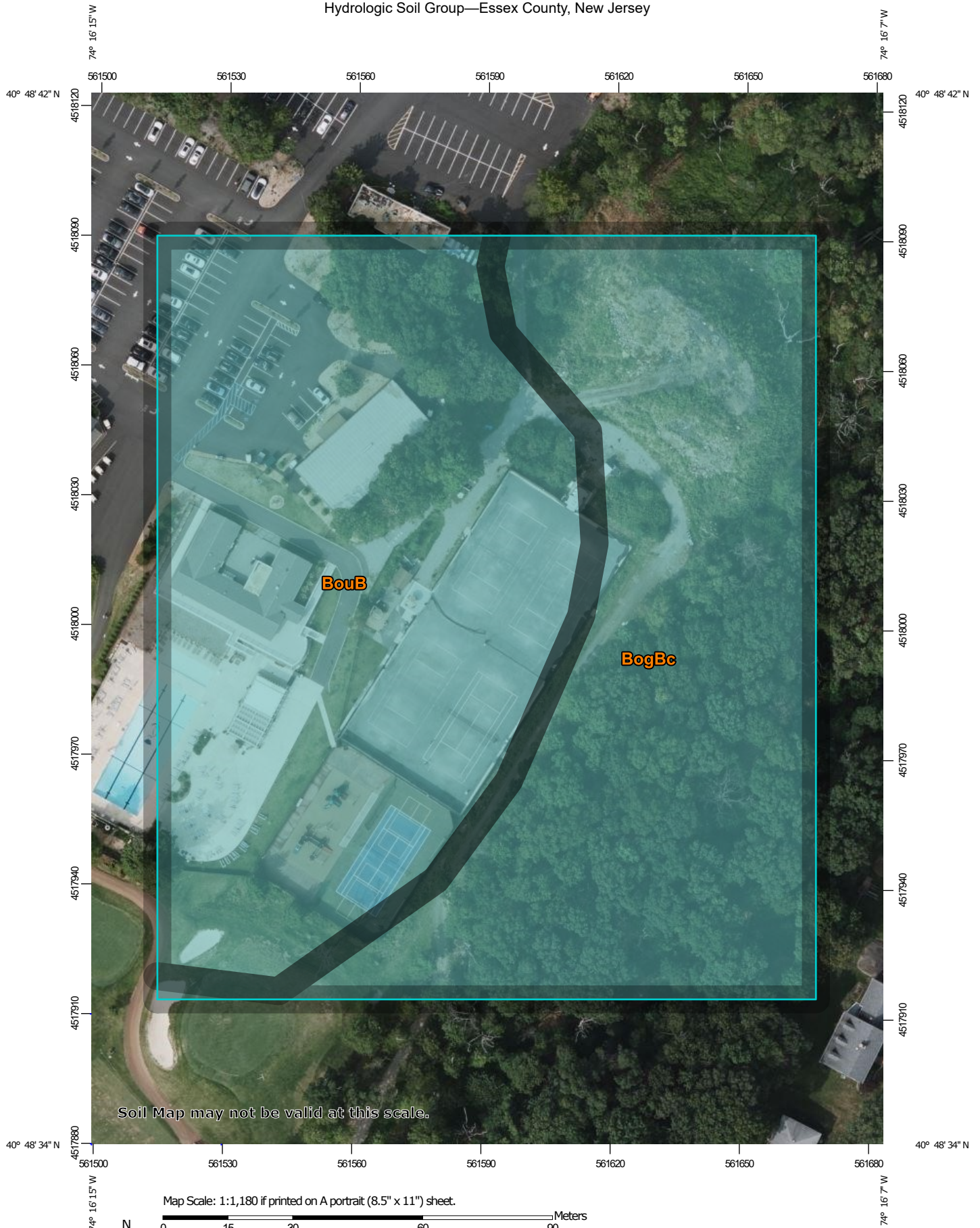
The project consists of less than one (1) acre of disturbance and will not increase the impervious coverage on-site by $\frac{1}{4}$ acre or more, therefore the proposed project does not meet the definition of a ‘major development’ and is not subject to the NJDEP Stormwater Management Rules (NJAC 7:8). The new courts and associated walkways consist of 0.13 acre of impervious coverage. The bulk of this will be constructed where impervious gravel now exists. The net increase in impervious area is 0.045 acre, which we consider to be de minimus with no negative effects on overall drainage patterns. We analyzed the site runoff in the existing and proposed condition for the 100-year storm. The work area currently has a peak discharge of 1.5 cfs. The proposed plan increases the peak runoff to 1.6 cfs. This is an increase of 0.1 cfs and have no noticeable impact to stormwater runoff on this site or any adjacent properties. The hydrographs have been added to the appendix of this report.

In conclusion, we feel the project has been designed to ensure safe and efficient control of the stormwater runoff in a manner that will not adversely impact the existing drainage patterns, adjacent roadways, or adjacent parcels. Due to the small size of the development, the increase in peak runoff is de minimus. There will be no negative impacts to the surround properties.

Appendix

NRCS Soil Survey

Hydrologic Soil Group—Essex County, New Jersey



Map Scale: 1:1,180 if printed on A portrait (8.5" x 11") sheet.

0 15 30 60 90 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

8/10/2022
Page 1 of 4

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 1:12,000.

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: Essex County, New Jersey
 Survey Area Data: Version 17, Aug 30, 2021

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

Date(s) aerial images were photographed: May 9, 2020—Oct 15, 2020

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
BogBc	Boonton loam, 0 to 8 percent slopes, extremely stony	C	3.1	46.8%
BouB	Boonton - Urban land, Boonton substratum complex, 0 to 8 percent slopes	C	3.6	53.2%
Totals for Area of Interest			6.7	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.

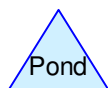
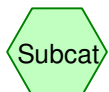
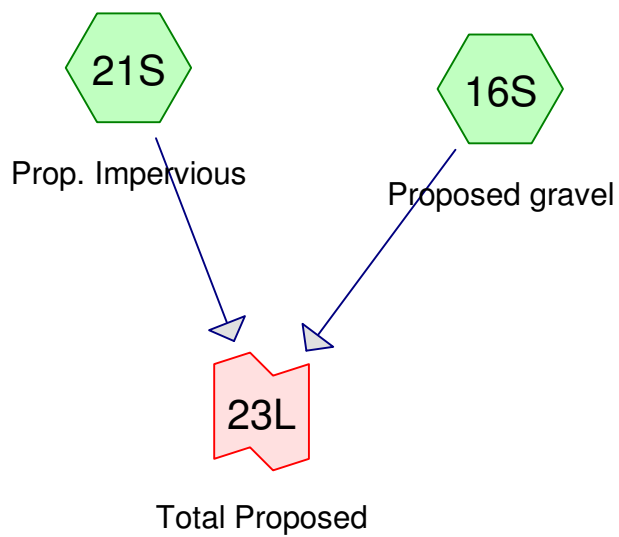
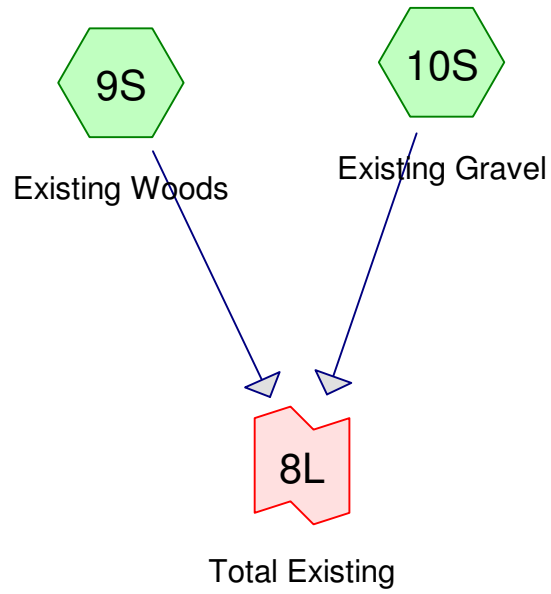
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

100-YEAR HYDROGRAPHS



Drainage analysis

NOAA 24-hr D 100YR STM Rainfall=8.72"

Prepared by Van Cleef Engineering Assoc

Printed 6/16/2023

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

Page 2

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 9S: Existing Woods

Runoff Area=0.035 ac 0.00% Impervious Runoff Depth=5.09"
Tc=10.0 min CN=70 Runoff=0.2 cfs 647 cf

Subcatchment 10S: Existing Gravel

Runoff Area=0.195 ac 0.00% Impervious Runoff Depth=7.39"
Tc=10.0 min CN=89 Runoff=1.3 cfs 5,234 cf

Subcatchment 16S: Proposed gravel

Runoff Area=0.096 ac 0.00% Impervious Runoff Depth=7.39"
Tc=10.0 min CN=89 Runoff=0.6 cfs 2,577 cf

Subcatchment 21S: Prop. Impervious

Runoff Area=0.134 ac 100.00% Impervious Runoff Depth=8.48"
Tc=10.0 min CN=98 Runoff=1.0 cfs 4,125 cf

Link 8L: Total Existing

Inflow=1.5 cfs 5,881 cf
Primary=1.5 cfs 5,881 cf

Link 23L: Total Proposed

Inflow=1.6 cfs 6,701 cf
Primary=1.6 cfs 6,701 cf

Total Runoff Area = 20,038 sf Runoff Volume = 12,582 cf Average Runoff Depth = 7.54"
70.87% Pervious = 14,201 sf 29.13% Impervious = 5,837 sf

Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 3

Summary for Subcatchment 9S: Existing Woods

Runoff = 0.2 cfs @ 12.17 hrs, Volume= 647 cf, Depth= 5.09"
Routed to Link 8L : Total Existing

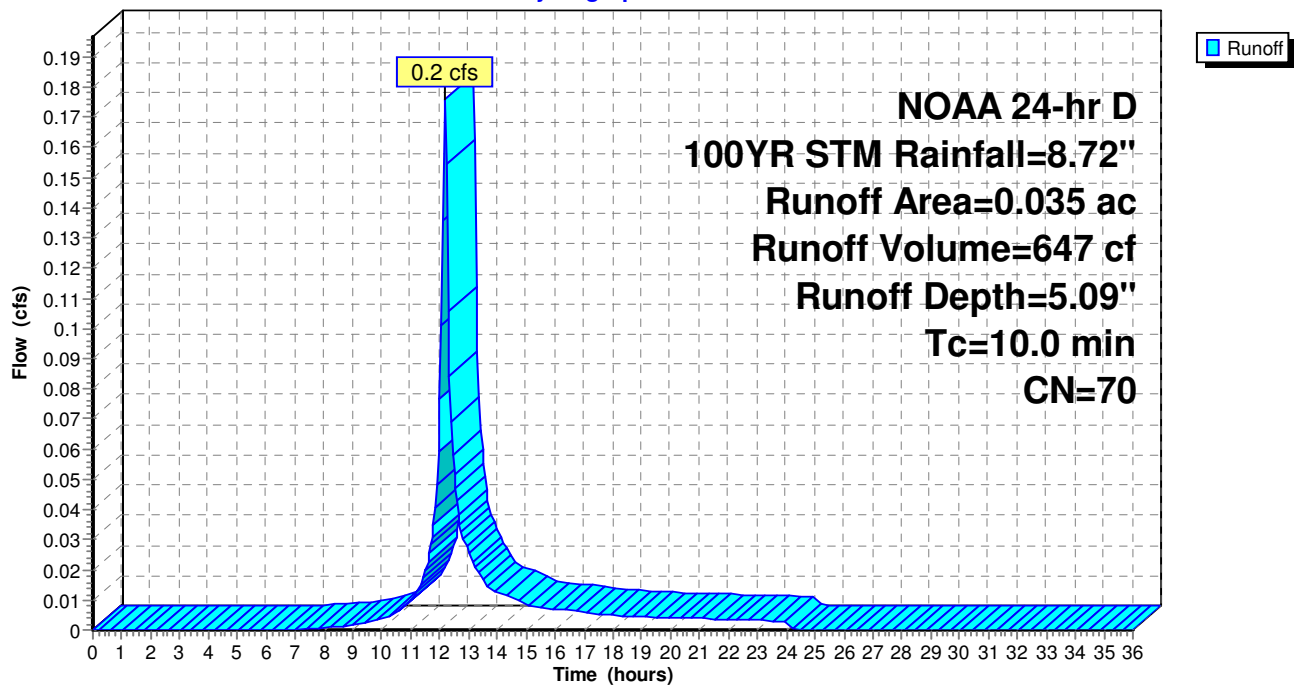
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100YR STM Rainfall=8.72"

Area (ac)	CN	Description
* 0.035	70	
0.035		100.00% Pervious Area

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

Subcatchment 9S: Existing Woods

Hydrograph



Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 4

Hydrograph for Subcatchment 9S: Existing Woods

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	27.00	8.72	5.09	0.0
0.50	0.05	0.00	0.0	27.50	8.72	5.09	0.0
1.00	0.10	0.00	0.0	28.00	8.72	5.09	0.0
1.50	0.15	0.00	0.0	28.50	8.72	5.09	0.0
2.00	0.21	0.00	0.0	29.00	8.72	5.09	0.0
2.50	0.27	0.00	0.0	29.50	8.72	5.09	0.0
3.00	0.33	0.00	0.0	30.00	8.72	5.09	0.0
3.50	0.39	0.00	0.0	30.50	8.72	5.09	0.0
4.00	0.46	0.00	0.0	31.00	8.72	5.09	0.0
4.50	0.53	0.00	0.0	31.50	8.72	5.09	0.0
5.00	0.60	0.00	0.0	32.00	8.72	5.09	0.0
5.50	0.67	0.00	0.0	32.50	8.72	5.09	0.0
6.00	0.74	0.00	0.0	33.00	8.72	5.09	0.0
6.50	0.83	0.00	0.0	33.50	8.72	5.09	0.0
7.00	0.92	0.00	0.0	34.00	8.72	5.09	0.0
7.50	1.02	0.01	0.0	34.50	8.72	5.09	0.0
8.00	1.13	0.02	0.0	35.00	8.72	5.09	0.0
8.50	1.25	0.03	0.0	35.50	8.72	5.09	0.0
9.00	1.38	0.06	0.0	36.00	8.72	5.09	0.0
9.50	1.54	0.09	0.0				
10.00	1.73	0.15	0.0				
10.50	1.95	0.22	0.0				
11.00	2.27	0.35	0.0				
11.50	2.76	0.59	0.0				
12.00	4.18	1.45	0.1				
12.50	5.96	2.77	0.1				
13.00	6.45	3.17	0.0				
13.50	6.77	3.43	0.0				
14.00	6.99	3.61	0.0				
14.50	7.18	3.77	0.0				
15.00	7.34	3.90	0.0				
15.50	7.47	4.01	0.0				
16.00	7.59	4.11	0.0				
16.50	7.70	4.21	0.0				
17.00	7.80	4.29	0.0				
17.50	7.89	4.37	0.0				
18.00	7.98	4.44	0.0				
18.50	8.05	4.51	0.0				
19.00	8.12	4.57	0.0				
19.50	8.19	4.63	0.0				
20.00	8.26	4.69	0.0				
20.50	8.33	4.75	0.0				
21.00	8.39	4.80	0.0				
21.50	8.45	4.86	0.0				
22.00	8.51	4.91	0.0				
22.50	8.57	4.95	0.0				
23.00	8.62	5.00	0.0				
23.50	8.67	5.05	0.0				
24.00	8.72	5.09	0.0				
24.50	8.72	5.09	0.0				
25.00	8.72	5.09	0.0				
25.50	8.72	5.09	0.0				
26.00	8.72	5.09	0.0				
26.50	8.72	5.09	0.0				

Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 5

Summary for Subcatchment 10S: Existing Gravel

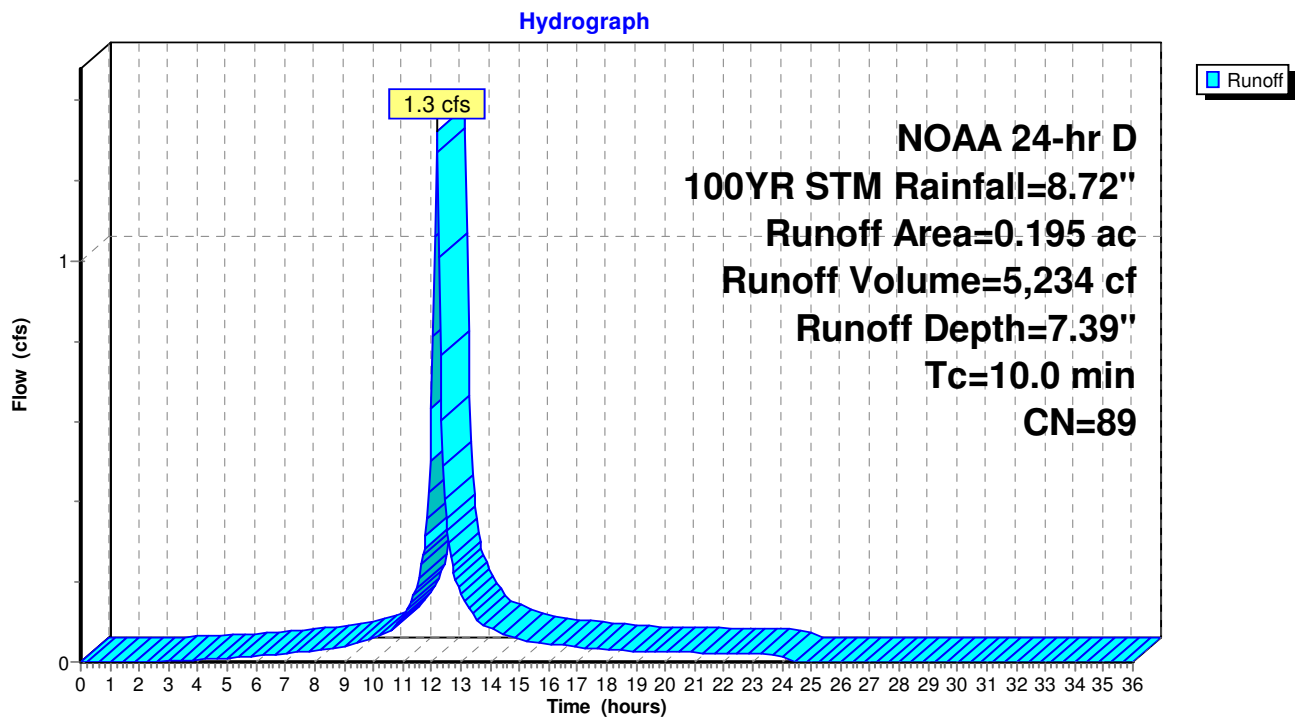
Runoff = 1.3 cfs @ 12.17 hrs, Volume= 5,234 cf, Depth= 7.39"
Routed to Link 8L : Total Existing

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100YR STM Rainfall=8.72"

Area (ac)	CN	Description
* 0.195	89	
0.195		100.00% Pervious Area

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

Subcatchment 10S: Existing Gravel



Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 6

Hydrograph for Subcatchment 10S: Existing Gravel

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	27.00	8.72	7.39	0.0
0.50	0.05	0.00	0.0	27.50	8.72	7.39	0.0
1.00	0.10	0.00	0.0	28.00	8.72	7.39	0.0
1.50	0.15	0.00	0.0	28.50	8.72	7.39	0.0
2.00	0.21	0.00	0.0	29.00	8.72	7.39	0.0
2.50	0.27	0.00	0.0	29.50	8.72	7.39	0.0
3.00	0.33	0.01	0.0	30.00	8.72	7.39	0.0
3.50	0.39	0.02	0.0	30.50	8.72	7.39	0.0
4.00	0.46	0.03	0.0	31.00	8.72	7.39	0.0
4.50	0.53	0.05	0.0	31.50	8.72	7.39	0.0
5.00	0.60	0.08	0.0	32.00	8.72	7.39	0.0
5.50	0.67	0.11	0.0	32.50	8.72	7.39	0.0
6.00	0.74	0.14	0.0	33.00	8.72	7.39	0.0
6.50	0.83	0.18	0.0	33.50	8.72	7.39	0.0
7.00	0.92	0.24	0.0	34.00	8.72	7.39	0.0
7.50	1.02	0.30	0.0	34.50	8.72	7.39	0.0
8.00	1.13	0.37	0.0	35.00	8.72	7.39	0.0
8.50	1.25	0.45	0.0	35.50	8.72	7.39	0.0
9.00	1.38	0.54	0.0	36.00	8.72	7.39	0.0
9.50	1.54	0.66	0.0				
10.00	1.73	0.81	0.1				
10.50	1.95	0.99	0.1				
11.00	2.27	1.25	0.1				
11.50	2.76	1.69	0.2				
12.00	4.18	2.99	0.6				
12.50	5.96	4.69	0.4				
13.00	6.45	5.18	0.2				
13.50	6.77	5.48	0.1				
14.00	6.99	5.70	0.1				
14.50	7.18	5.89	0.1				
15.00	7.34	6.04	0.1				
15.50	7.47	6.16	0.0				
16.00	7.59	6.28	0.0				
16.50	7.70	6.39	0.0				
17.00	7.80	6.49	0.0				
17.50	7.89	6.58	0.0				
18.00	7.98	6.66	0.0				
18.50	8.05	6.74	0.0				
19.00	8.12	6.81	0.0				
19.50	8.19	6.88	0.0				
20.00	8.26	6.94	0.0				
20.50	8.33	7.01	0.0				
21.00	8.39	7.07	0.0				
21.50	8.45	7.13	0.0				
22.00	8.51	7.19	0.0				
22.50	8.57	7.24	0.0				
23.00	8.62	7.30	0.0				
23.50	8.67	7.35	0.0				
24.00	8.72	7.39	0.0				
24.50	8.72	7.39	0.0				
25.00	8.72	7.39	0.0				
25.50	8.72	7.39	0.0				
26.00	8.72	7.39	0.0				
26.50	8.72	7.39	0.0				

Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 7

Summary for Subcatchment 16S: Proposed gravel

Runoff = 0.6 cfs @ 12.17 hrs, Volume= 2,577 cf, Depth= 7.39"

Routed to Link 23L : Total Proposed

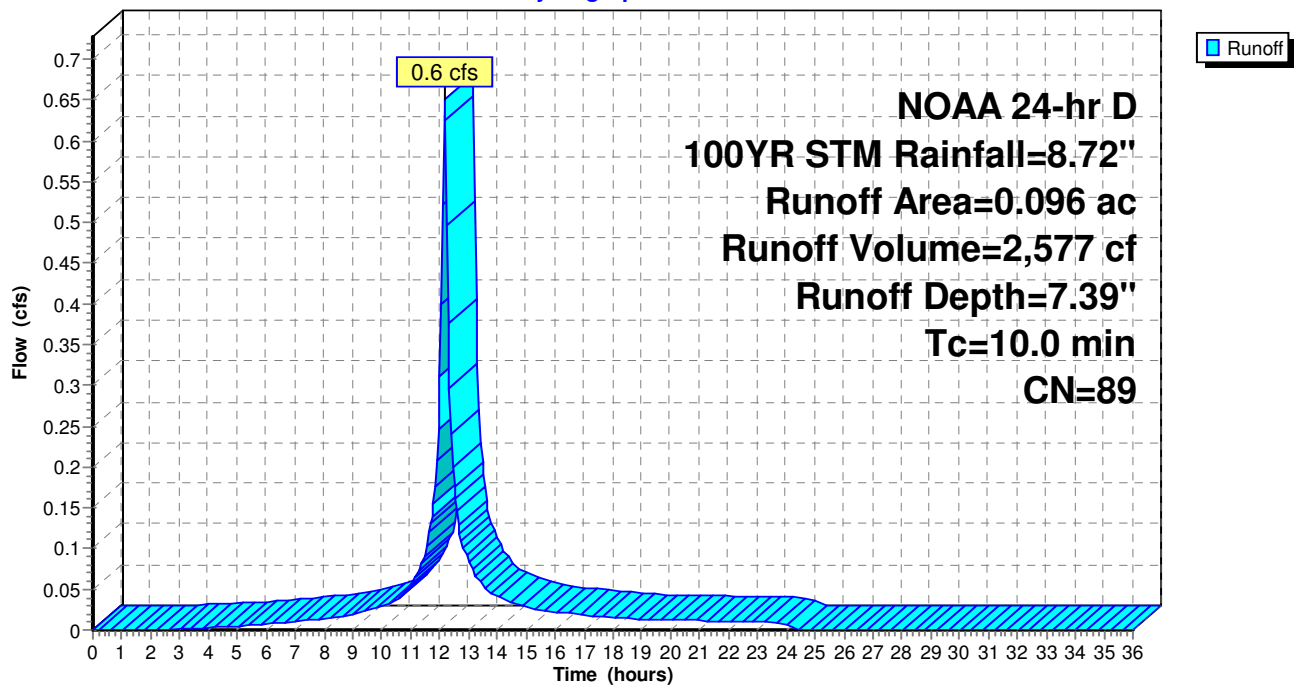
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100YR STM Rainfall=8.72"

Area (ac)	CN	Description
* 0.096	89	
0.096		100.00% Pervious Area

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

Subcatchment 16S: Proposed gravel

Hydrograph



Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 8

Hydrograph for Subcatchment 16S: Proposed gravel

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	27.00	8.72	7.39	0.0
0.50	0.05	0.00	0.0	27.50	8.72	7.39	0.0
1.00	0.10	0.00	0.0	28.00	8.72	7.39	0.0
1.50	0.15	0.00	0.0	28.50	8.72	7.39	0.0
2.00	0.21	0.00	0.0	29.00	8.72	7.39	0.0
2.50	0.27	0.00	0.0	29.50	8.72	7.39	0.0
3.00	0.33	0.01	0.0	30.00	8.72	7.39	0.0
3.50	0.39	0.02	0.0	30.50	8.72	7.39	0.0
4.00	0.46	0.03	0.0	31.00	8.72	7.39	0.0
4.50	0.53	0.05	0.0	31.50	8.72	7.39	0.0
5.00	0.60	0.08	0.0	32.00	8.72	7.39	0.0
5.50	0.67	0.11	0.0	32.50	8.72	7.39	0.0
6.00	0.74	0.14	0.0	33.00	8.72	7.39	0.0
6.50	0.83	0.18	0.0	33.50	8.72	7.39	0.0
7.00	0.92	0.24	0.0	34.00	8.72	7.39	0.0
7.50	1.02	0.30	0.0	34.50	8.72	7.39	0.0
8.00	1.13	0.37	0.0	35.00	8.72	7.39	0.0
8.50	1.25	0.45	0.0	35.50	8.72	7.39	0.0
9.00	1.38	0.54	0.0	36.00	8.72	7.39	0.0
9.50	1.54	0.66	0.0				
10.00	1.73	0.81	0.0				
10.50	1.95	0.99	0.0				
11.00	2.27	1.25	0.1				
11.50	2.76	1.69	0.1				
12.00	4.18	2.99	0.3				
12.50	5.96	4.69	0.2				
13.00	6.45	5.18	0.1				
13.50	6.77	5.48	0.1				
14.00	6.99	5.70	0.0				
14.50	7.18	5.89	0.0				
15.00	7.34	6.04	0.0				
15.50	7.47	6.16	0.0				
16.00	7.59	6.28	0.0				
16.50	7.70	6.39	0.0				
17.00	7.80	6.49	0.0				
17.50	7.89	6.58	0.0				
18.00	7.98	6.66	0.0				
18.50	8.05	6.74	0.0				
19.00	8.12	6.81	0.0				
19.50	8.19	6.88	0.0				
20.00	8.26	6.94	0.0				
20.50	8.33	7.01	0.0				
21.00	8.39	7.07	0.0				
21.50	8.45	7.13	0.0				
22.00	8.51	7.19	0.0				
22.50	8.57	7.24	0.0				
23.00	8.62	7.30	0.0				
23.50	8.67	7.35	0.0				
24.00	8.72	7.39	0.0				
24.50	8.72	7.39	0.0				
25.00	8.72	7.39	0.0				
25.50	8.72	7.39	0.0				
26.00	8.72	7.39	0.0				
26.50	8.72	7.39	0.0				

Drainage analysis

Prepared by Van Cleaf Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 9

Summary for Subcatchment 21S: Prop. Impervious

Runoff = 1.0 cfs @ 12.17 hrs, Volume= 4,125 cf, Depth= 8.48"

Routed to Link 23L : Total Proposed

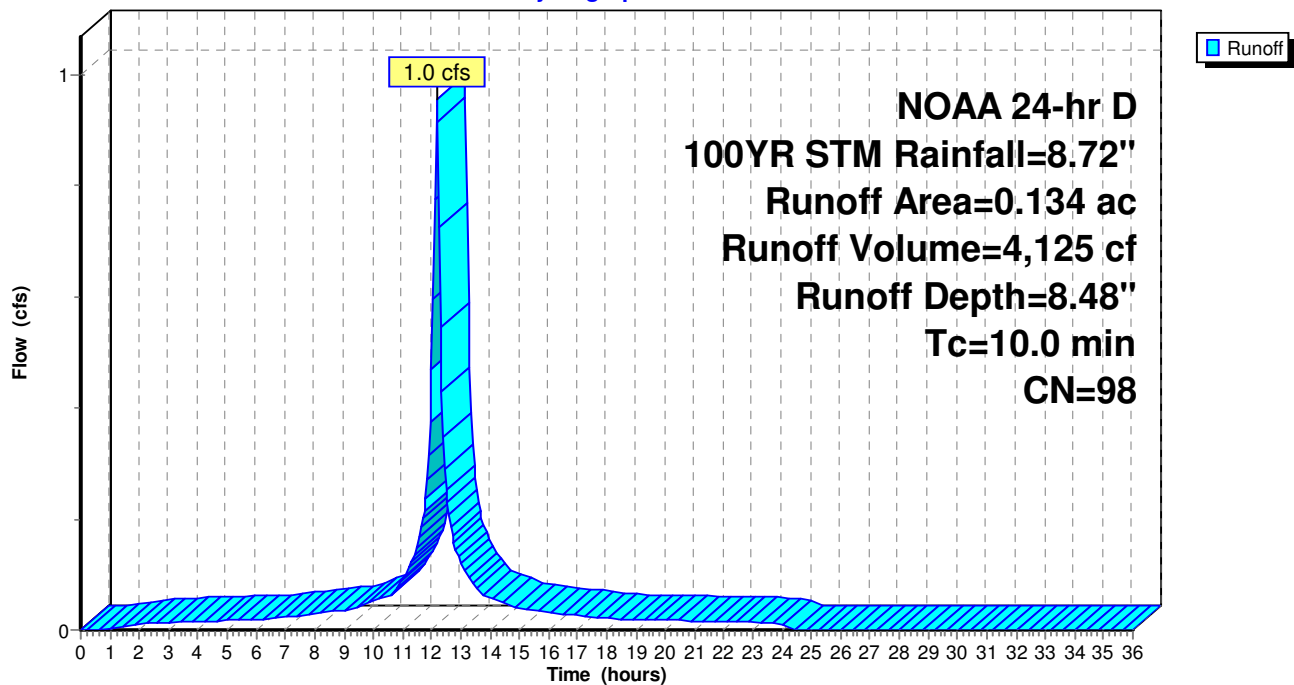
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100YR STM Rainfall=8.72"

Area (ac)	CN	Description
* 0.134	98	
0.134		100.00% Impervious Area

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

Subcatchment 21S: Prop. Impervious

Hydrograph



Drainage analysis

Prepared by Van Cleaf Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 10

Hydrograph for Subcatchment 21S: Prop. Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	27.00	8.72	8.48	0.0
0.50	0.05	0.00	0.0	27.50	8.72	8.48	0.0
1.00	0.10	0.01	0.0	28.00	8.72	8.48	0.0
1.50	0.15	0.04	0.0	28.50	8.72	8.48	0.0
2.00	0.21	0.08	0.0	29.00	8.72	8.48	0.0
2.50	0.27	0.12	0.0	29.50	8.72	8.48	0.0
3.00	0.33	0.17	0.0	30.00	8.72	8.48	0.0
3.50	0.39	0.22	0.0	30.50	8.72	8.48	0.0
4.00	0.46	0.28	0.0	31.00	8.72	8.48	0.0
4.50	0.53	0.34	0.0	31.50	8.72	8.48	0.0
5.00	0.60	0.41	0.0	32.00	8.72	8.48	0.0
5.50	0.67	0.47	0.0	32.50	8.72	8.48	0.0
6.00	0.74	0.55	0.0	33.00	8.72	8.48	0.0
6.50	0.83	0.62	0.0	33.50	8.72	8.48	0.0
7.00	0.92	0.71	0.0	34.00	8.72	8.48	0.0
7.50	1.02	0.81	0.0	34.50	8.72	8.48	0.0
8.00	1.13	0.92	0.0	35.00	8.72	8.48	0.0
8.50	1.25	1.04	0.0	35.50	8.72	8.48	0.0
9.00	1.38	1.17	0.0	36.00	8.72	8.48	0.0
9.50	1.54	1.32	0.0				
10.00	1.73	1.51	0.1				
10.50	1.95	1.73	0.1				
11.00	2.27	2.04	0.1				
11.50	2.76	2.53	0.1				
12.00	4.18	3.94	0.5				
12.50	5.96	5.72	0.3				
13.00	6.45	6.21	0.1				
13.50	6.77	6.53	0.1				
14.00	6.99	6.75	0.1				
14.50	7.18	6.94	0.0				
15.00	7.34	7.10	0.0				
15.50	7.47	7.23	0.0				
16.00	7.59	7.35	0.0				
16.50	7.70	7.46	0.0				
17.00	7.80	7.56	0.0				
17.50	7.89	7.65	0.0				
18.00	7.98	7.74	0.0				
18.50	8.05	7.81	0.0				
19.00	8.12	7.88	0.0				
19.50	8.19	7.95	0.0				
20.00	8.26	8.02	0.0				
20.50	8.33	8.09	0.0				
21.00	8.39	8.15	0.0				
21.50	8.45	8.21	0.0				
22.00	8.51	8.27	0.0				
22.50	8.57	8.33	0.0				
23.00	8.62	8.38	0.0				
23.50	8.67	8.43	0.0				
24.00	8.72	8.48	0.0				
24.50	8.72	8.48	0.0				
25.00	8.72	8.48	0.0				
25.50	8.72	8.48	0.0				
26.00	8.72	8.48	0.0				
26.50	8.72	8.48	0.0				

Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

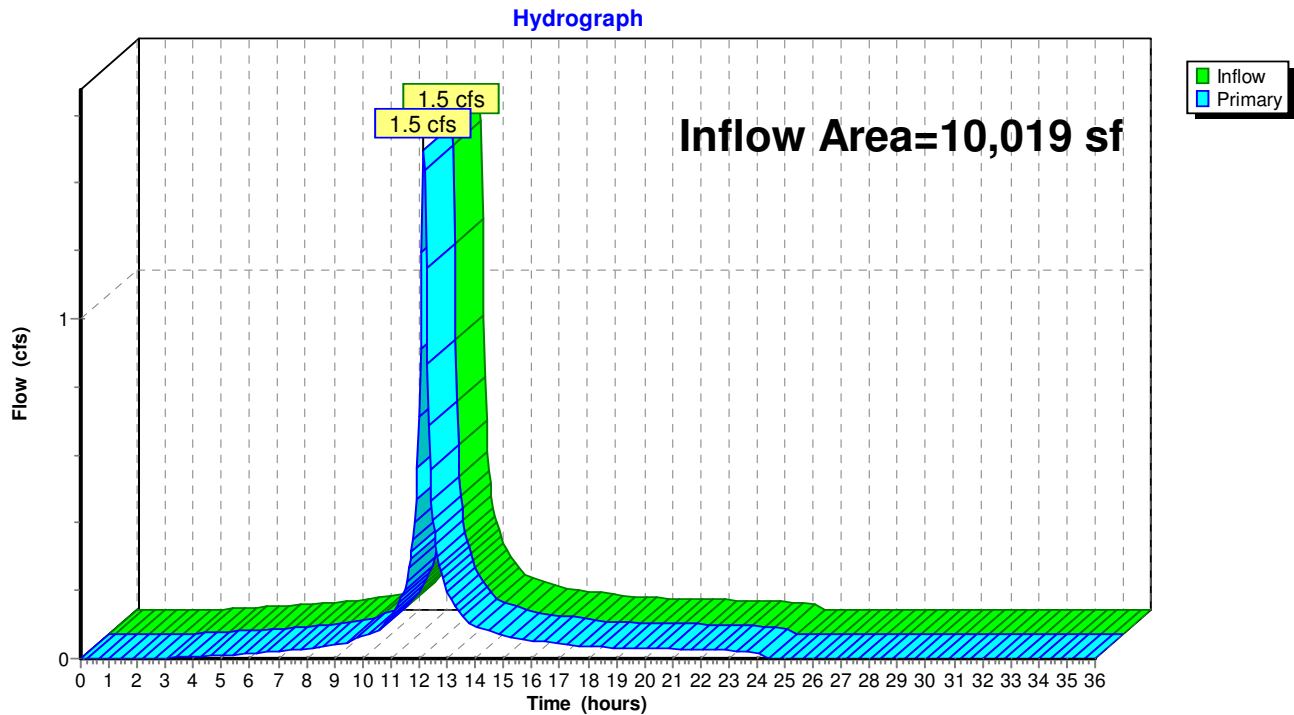
Page 11

Summary for Link 8L: Total Existing

Inflow Area = 10,019 sf, 0.00% Impervious, Inflow Depth = 7.04" for 100YR STM event
Inflow = 1.5 cfs @ 12.17 hrs, Volume= 5,881 cf
Primary = 1.5 cfs @ 12.17 hrs, Volume= 5,881 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 8L: Total Existing



Drainage analysis

NOAA 24-hr D 100YR STM Rainfall=8.72"

Prepared by Van Cleef Engineering Assoc

Printed 6/16/2023

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

Page 12

Hydrograph for Link 8L: Total Existing

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.0	0.00	0.0	27.00	0.0	0.00	0.0
0.50	0.0	0.00	0.0	27.50	0.0	0.00	0.0
1.00	0.0	0.00	0.0	28.00	0.0	0.00	0.0
1.50	0.0	0.00	0.0	28.50	0.0	0.00	0.0
2.00	0.0	0.00	0.0	29.00	0.0	0.00	0.0
2.50	0.0	0.00	0.0	29.50	0.0	0.00	0.0
3.00	0.0	0.00	0.0	30.00	0.0	0.00	0.0
3.50	0.0	0.00	0.0	30.50	0.0	0.00	0.0
4.00	0.0	0.00	0.0	31.00	0.0	0.00	0.0
4.50	0.0	0.00	0.0	31.50	0.0	0.00	0.0
5.00	0.0	0.00	0.0	32.00	0.0	0.00	0.0
5.50	0.0	0.00	0.0	32.50	0.0	0.00	0.0
6.00	0.0	0.00	0.0	33.00	0.0	0.00	0.0
6.50	0.0	0.00	0.0	33.50	0.0	0.00	0.0
7.00	0.0	0.00	0.0	34.00	0.0	0.00	0.0
7.50	0.0	0.00	0.0	34.50	0.0	0.00	0.0
8.00	0.0	0.00	0.0	35.00	0.0	0.00	0.0
8.50	0.0	0.00	0.0	35.50	0.0	0.00	0.0
9.00	0.0	0.00	0.0	36.00	0.0	0.00	0.0
9.50	0.1	0.00	0.1				
10.00	0.1	0.00	0.1				
10.50	0.1	0.00	0.1				
11.00	0.1	0.00	0.1				
11.50	0.2	0.00	0.2				
12.00	0.7	0.00	0.7				
12.50	0.4	0.00	0.4				
13.00	0.2	0.00	0.2				
13.50	0.1	0.00	0.1				
14.00	0.1	0.00	0.1				
14.50	0.1	0.00	0.1				
15.00	0.1	0.00	0.1				
15.50	0.1	0.00	0.1				
16.00	0.1	0.00	0.1				
16.50	0.0	0.00	0.0				
17.00	0.0	0.00	0.0				
17.50	0.0	0.00	0.0				
18.00	0.0	0.00	0.0				
18.50	0.0	0.00	0.0				
19.00	0.0	0.00	0.0				
19.50	0.0	0.00	0.0				
20.00	0.0	0.00	0.0				
20.50	0.0	0.00	0.0				
21.00	0.0	0.00	0.0				
21.50	0.0	0.00	0.0				
22.00	0.0	0.00	0.0				
22.50	0.0	0.00	0.0				
23.00	0.0	0.00	0.0				
23.50	0.0	0.00	0.0				
24.00	0.0	0.00	0.0				
24.50	0.0	0.00	0.0				
25.00	0.0	0.00	0.0				
25.50	0.0	0.00	0.0				
26.00	0.0	0.00	0.0				
26.50	0.0	0.00	0.0				

Drainage analysis

Prepared by Van Cleeef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

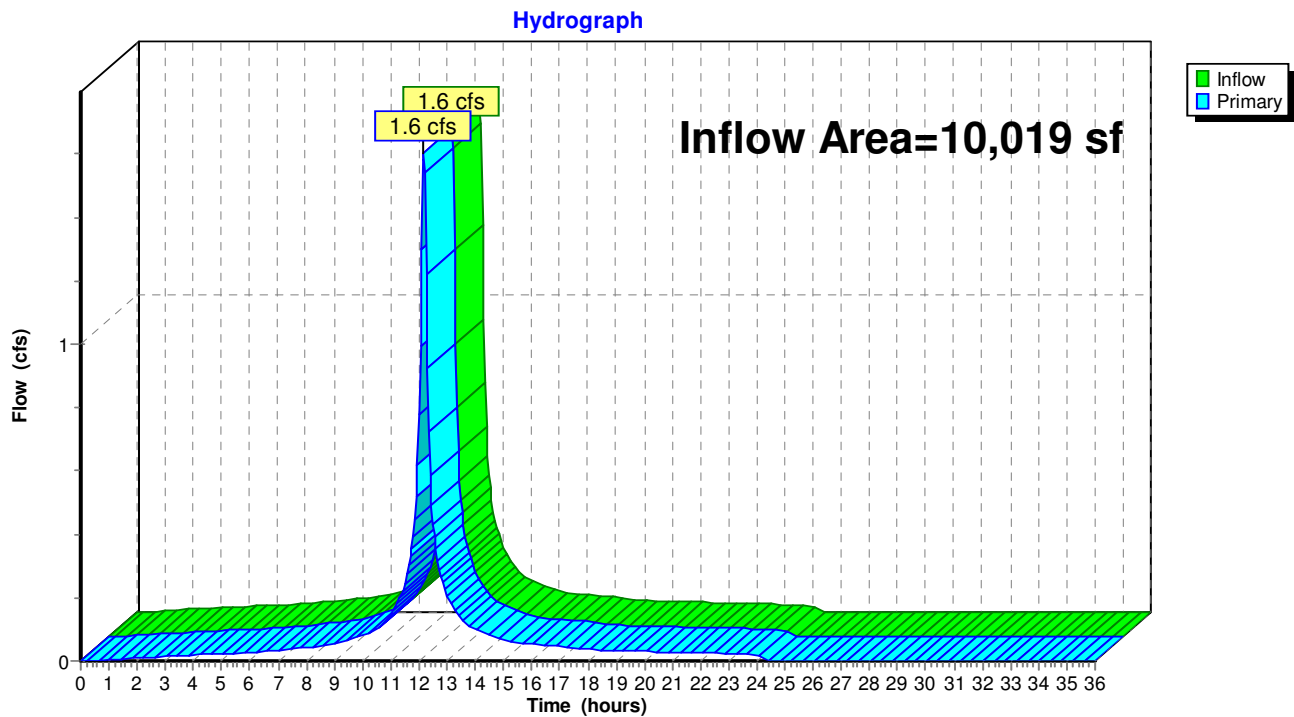
Page 13

Summary for Link 23L: Total Proposed

Inflow Area = 10,019 sf, 58.26% Impervious, Inflow Depth = 8.03" for 100YR STM event
Inflow = 1.6 cfs @ 12.17 hrs, Volume= 6,701 cf
Primary = 1.6 cfs @ 12.17 hrs, Volume= 6,701 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 24P

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 23L: Total Proposed



Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

NOAA 24-hr D 100YR STM Rainfall=8.72"

Printed 6/16/2023

Page 14

Hydrograph for Link 23L: Total Proposed

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.0	0.00	0.0	27.00	0.0	0.00	0.0
0.50	0.0	0.00	0.0	27.50	0.0	0.00	0.0
1.00	0.0	0.00	0.0	28.00	0.0	0.00	0.0
1.50	0.0	0.00	0.0	28.50	0.0	0.00	0.0
2.00	0.0	0.00	0.0	29.00	0.0	0.00	0.0
2.50	0.0	0.00	0.0	29.50	0.0	0.00	0.0
3.00	0.0	0.00	0.0	30.00	0.0	0.00	0.0
3.50	0.0	0.00	0.0	30.50	0.0	0.00	0.0
4.00	0.0	0.00	0.0	31.00	0.0	0.00	0.0
4.50	0.0	0.00	0.0	31.50	0.0	0.00	0.0
5.00	0.0	0.00	0.0	32.00	0.0	0.00	0.0
5.50	0.0	0.00	0.0	32.50	0.0	0.00	0.0
6.00	0.0	0.00	0.0	33.00	0.0	0.00	0.0
6.50	0.0	0.00	0.0	33.50	0.0	0.00	0.0
7.00	0.0	0.00	0.0	34.00	0.0	0.00	0.0
7.50	0.0	0.00	0.0	34.50	0.0	0.00	0.0
8.00	0.0	0.00	0.0	35.00	0.0	0.00	0.0
8.50	0.0	0.00	0.0	35.50	0.0	0.00	0.0
9.00	0.1	0.00	0.1	36.00	0.0	0.00	0.0
9.50	0.1	0.00	0.1				
10.00	0.1	0.00	0.1				
10.50	0.1	0.00	0.1				
11.00	0.1	0.00	0.1				
11.50	0.2	0.00	0.2				
12.00	0.8	0.00	0.8				
12.50	0.4	0.00	0.4				
13.00	0.2	0.00	0.2				
13.50	0.1	0.00	0.1				
14.00	0.1	0.00	0.1				
14.50	0.1	0.00	0.1				
15.00	0.1	0.00	0.1				
15.50	0.1	0.00	0.1				
16.00	0.1	0.00	0.1				
16.50	0.1	0.00	0.1				
17.00	0.0	0.00	0.0				
17.50	0.0	0.00	0.0				
18.00	0.0	0.00	0.0				
18.50	0.0	0.00	0.0				
19.00	0.0	0.00	0.0				
19.50	0.0	0.00	0.0				
20.00	0.0	0.00	0.0				
20.50	0.0	0.00	0.0				
21.00	0.0	0.00	0.0				
21.50	0.0	0.00	0.0				
22.00	0.0	0.00	0.0				
22.50	0.0	0.00	0.0				
23.00	0.0	0.00	0.0				
23.50	0.0	0.00	0.0				
24.00	0.0	0.00	0.0				
24.50	0.0	0.00	0.0				
25.00	0.0	0.00	0.0				
25.50	0.0	0.00	0.0				
26.00	0.0	0.00	0.0				
26.50	0.0	0.00	0.0				

Drainage analysis

Prepared by Van Cleef Engineering Assoc

HydroCAD® 10.20-3c s/n 03584 © 2023 HydroCAD Software Solutions LLC

Table of Contents

Printed 6/16/2023

TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram

100YR STM Event

- 2 Node Listing
- 3 Subcat 9S: Existing Woods
- 5 Subcat 10S: Existing Gravel
- 7 Subcat 16S: Proposed gravel
- 9 Subcat 21S: Prop. Impervious
- 11 Link 8L: Total Existing
- 13 Link 23L: Total Proposed